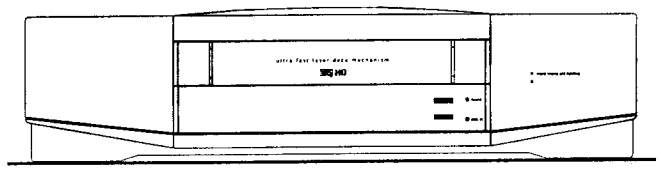
Video Cassette Recorder — Deck : Turbo Drive — Lucy 7

Service
Service
Service

VR722/02/05/08/13
VR723/02/05

VR7229/39
VR7225
VR727/05



ServiceManual

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/05	PAL I
/08	PAL B/G Italy
/13	PAL B/G Nordic
/39	SECAM L & PAL B/G

Survey of remote controls :

VR722	RT520/112	4822 218 30659
VR7229	RT522/441	4822 218 30661
VR723	RT521/112	4822 218 30662

Survey of tapedecks :

VR722, VR7229	LTD 4/2	4 video heads +
VR723, VR5229	LTD 4/2	2 FM audio heads

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

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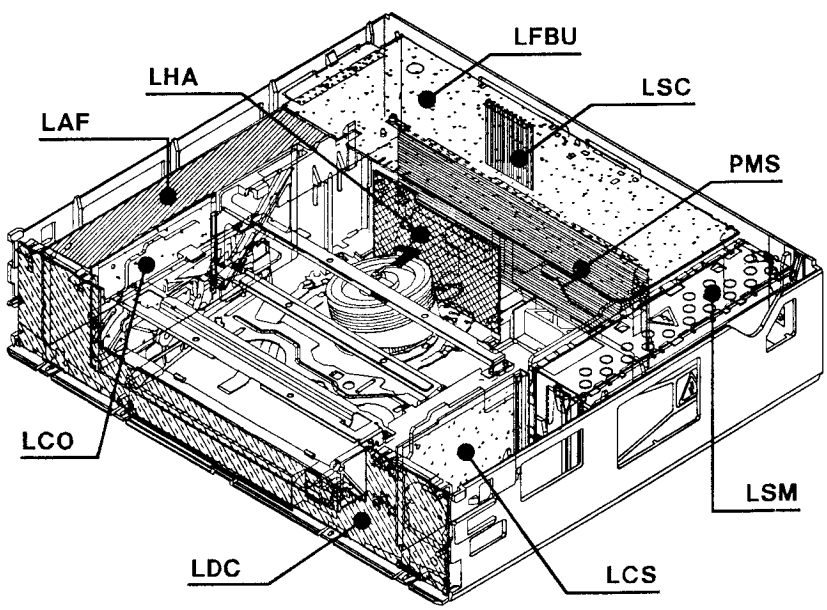

SURVEY OF SETS AND PCBs

Sets / PCBs	Page	VR722				VR7229	VR723	
		/02	/05	/08	/13	/39	/02	/05
Power supply	3-2/5							
LSM45		•	•	•	•	•	•	•
Head amplifier	3-6/7							
LHA 4/2		•	•	•	•	•	•	•
Family board	3-8/19							
LFBU 761/01					•			
LFBU 761/39						•		
LFBU 762/01				•				
LFBU 762/05			•					•
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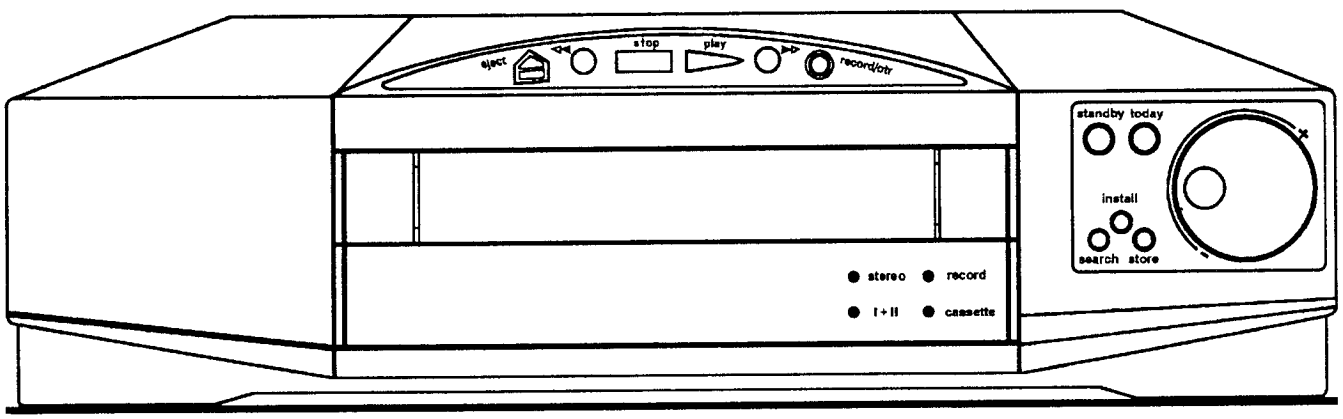
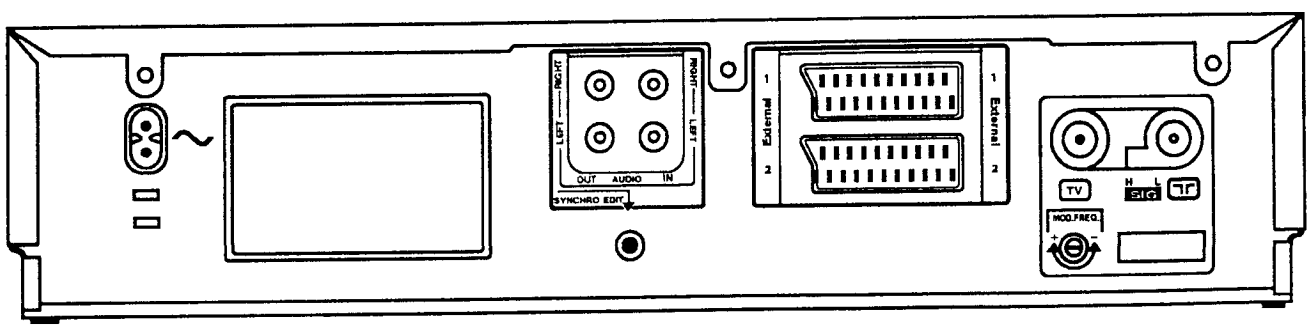
LFBU 764/02							•	
Scart Print	3-10/11							
LSC		•	•	•	•	•	•	•
Capstan Switch	3-16/17							
LCS		•	•	•	•	•	•	•
Signal electronics	3-20/23							
PMS 53/01		•		•	•		•	•
PMS 53/39						•		
PMS 54/01			•					
FM -Audio/Front end	3-24/31							
LAF/01		•		•			•	
LAF/05			•					•
LAF/13					•			
LAF/39						•		
Control board	3-34/40							
LCO		•			•	•		
LCOOSD			•	•				
LCOVPT							•	•
Operating panel	3-32/33							
LDCP5		•	•	•	•	•	•	•

Symbol on the video recorder	Function
EJECT	Cassette eject
◀◀	Rewind / Reverse scanning
STOP ■	Stop
PLAY	Playback
▶▶	Forward wind / Forward scanning
RECORD / OTR	Recording
STANDBY	Switch off
SEARCH	Channel search
INSTALL	Installation
STORE	Channel storage
TODAY	TODAY programming
−⊙+	+/- rotary control

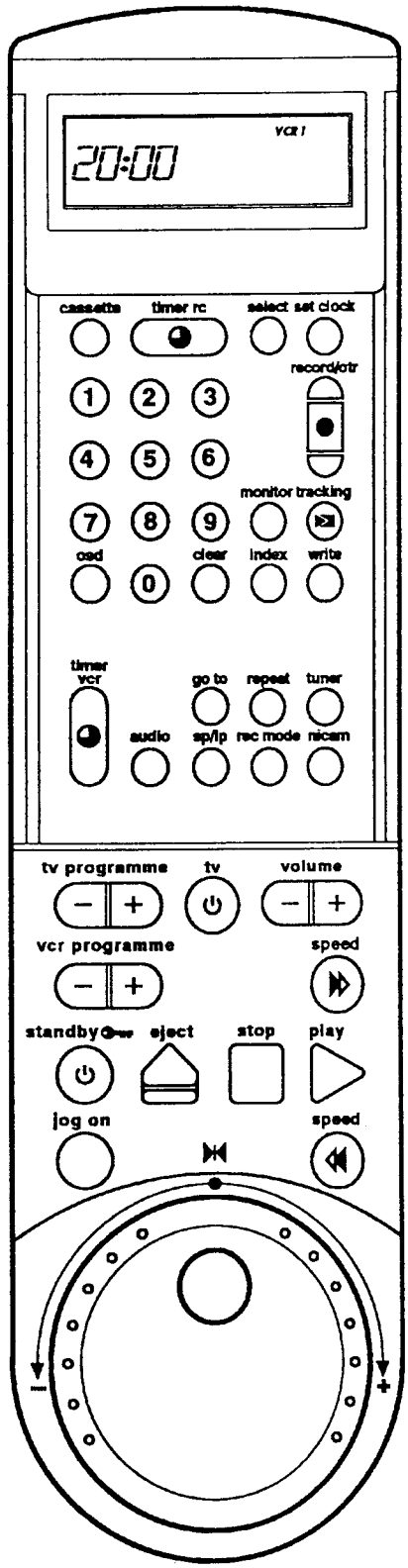


Symbol on the rear side of the video recorder	Function
∿	Mains socket
TV	Aerial output socket
⊓⊓	Aerial input socket
EXTERNAL 1	AV-Euro-socket 1 (scart)
EXTERNAL 2	AV-Euro-socket 2 (scart)
SYNCHRO EDIT	Synchro-Edit socket
+⊙−	Channel control
SIG	Attenuation switch
AUDIO IN RIGHT	Audio input, right channel
AUDIO IN LEFT	Audio input, left channel
AUDIO OUT RIGHT	Audio output, right channel
AUDIO OUT LEFT	Audio output, left channel



Detailed information concerning the various functions is given in the relevant sections.

Symbol on the remote control	Function
RECORD / OTR	Record
TIMER RC	TIMER programming on the remote control
STANDBY	Switch off (standby) / Child lock
EJECT	Cassette eject
CASSETTE	Tape length selector
SELECT	Function selector
SET CLOCK	Setting clock on remote control
TRACKING	Auto-tracking/Fine tuning
0-9	Digit buttons
VCR PROGRAMME +/–	Plus/Minus
INDEX	VISS search function
WRITE	Set/erase VISS marker
MONITOR	Activate the TV monitor function
OSD	On Screen Display (OSD)
CLEAR	Reset/Clear
TUNER	Tuner mode
GO TO	Search for tape position (GO TO)
TIMER VCR	Correct/cancel TIMER
REC.MODE	Recording mode (input selection button)
REPEAT	Continuous function
SP/LP	Tape speed (SP/LP)
NICAM	NICAM on/off
AUDIO	Sound track selection
◀◀	Rewind / Reverse scanning
▶	Playback
▶▶	Forward wind / Forward scanning
STOP ■	Stop
-◎+	Single frame/Scanning control (JOG/SHUTTLE)
JOG ON	Single frame/Scanning function on/off



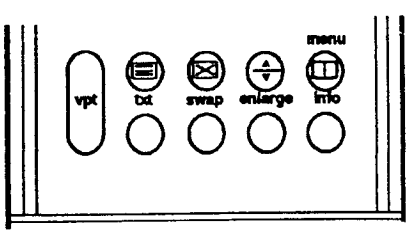
Additional TV functions (only for TV sets with the same remote control code):

TV PROGRAMME +/–	TV channel +/-
TV VOLUME +/–	TV volume +/-
TV ⏻	Switch off TV

Note: If you press the buttons TV PROGRAMME – and + simultaneously, the programme number 'AV' (EXT 1) can be called up directly.

For sets with TXT

?	TXT concealed information
HOLD	TXT page stop
TXT	TXT on/off
SWAP	TXT off (temporarily)
ENLARGE	TXT enlarged print
INFO	Menu button and TXT index
VPT	Programming with TXT (VPT)
◎	TXT special function buttons: RED, GREEN, YELLOW, BLUE



TECHNICAL DATA	TECHNISCHE DATEN	CARACTERISTIQUES	
Mains voltage	Netzspannung	Tension secteur	220 - 240 V
Mains frequency	Netzfrequenz	Fréquence	47 - 63 Hz
Power consumption	Leistungsaufnahme	Puissance absorbée	22 W
Power consumption	Leistungsaufnahme	Puissance absorbée	15 W (stand by)
Ambient temperature	Raumtemperatur	Température ambiante	+10°C - +35°C
Relative humidity	Relative Luftfeuchte	Humidité relative	20 - 80%
Dimensions	Abmessungen	Encombrement	380 x 86 x 338 mm
Weight	Gewicht	Poids	~ 6,5 kg
Fast forward/rewind time	Vor-/Rückspulzeit	Temps (re-)bobinage	typ. 95s (E180 cass.)
Position of use	Betriebslage	Position d'emploi	horizontally, max 15°
Video-resolution	Video-Auflösung	Puissance absorbée	>240 lines
Audio	Audio	Audio	80Hz - 10kHz (<8dB)
			80Hz - 5kHz (<8dB) LP
FM Audio	FM Audio	FM Audio	20Hz - 20kHz (<3dB)

TECHNISCHE GEGEVENS	DATOS TECNICOS	DATI TECNICI	
Netspanning	Tensión de red	Tensione di alimentazione	220 - 240 V
Netfrequentie	Frecuencia de red	Frequenza di rete	47 - 63 Hz
Opgenomen vermogen	Consumo de potencia	Potenza assorbita	22 W
Opgenomen vermogen	Consumo de potencia	Potenza assorbita	15 W (stand by)
Omgevingstemperatuur	Temperatura ambiente	Temperatura ambiente	+10°C - +35°C
Relatieve vochtigheid	Humedad relativa	Umiditá relativa	20 - 80%
Afmetingen	Dimensiones	Dimensioni	380 x 86 x 338 mm
Gewicht	Peso	Peso	~ 6,5 kg
Vooruit/terugspoeltijd	tiempo de (re-)bobinado	Tempo di (ri-)avvolgimento	typ. 95s (E180 cass.)
Gebruikspositie	Posición de uso	Posizione di funzionamento	horizontally, max 15°
Oplossend vermogen	Resolución video	Risoluzione video	>240 lines
Audio	Audio	Audio	80Hz - 10kHz (<8dB)
			80Hz - 5kHz (<8dB) LP
FM Audio	FM Audio	FM Audio	20Hz - 20kHz (<3dB)

SAFETY INSTRUCTIONS

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.
  Safety components are marked by the symbol $ or
- All IC s and many other semi- conductors are susceptible to electrostatic discharges(ESD). Careless handling during repair may reduce life drastically. When repairing, make sure that you are conneted with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools on the same potential.
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- Never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to prelude short-circuit or to prevent a specific circuit from being rendered unstable.

REMARKS

- The direct voltages and oscillograms ought to be measured relative to the set mass.
- The direct voltages and oscillograms mentioned in the diagrams ought to be measured with a colour bar signal and the picture carrier at 503.25 MHz (C25).
- The oscillograms and direct voltages have been measured in RECORD or PLAY mode.
- The semiconductors, which are mentioned in the circuit diagram and in the parts lists, are fully exchangeable per position with the semiconductors in the set, irrespective of the type designation of these semiconductors.

SICHERHEITSHINWEISE

- Die Sicherheitsvorschriften erfordern es, daß sich das Gerät nach der Reparatur in seinem originalen Zustand befindet und daß die zur Reparatur benutzten Ersatzteile mit den Original Ersatzteilen identisch sind.
  Sicherheits-Bauteile sind mit der Markierung $ oder versehen
- Alle IC's und Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD). Unvorschriftmäßige Behandlung von Halbleitern im Reparaturfall, kann zur Zerstörung dieser Bauteile oder zu einer drastischen Reduzierung der Lebensdauer führen. Sorgen Sie dafür, daß Sie sich im Reparaturfall über ein Armband mit Widerstand auf dem gleichen Potential, wie die Masse des Gerätes befinden. Alle Bauteile, Werkzeuge und Hilfsmittel sind auf das gleiche Potential zu legen.
- Ein zu reparierendes Gerät ist immer über einen Trenn transformator an die Netzspannung anzuschließen.
- Bei eingeschaltetem Gerät dürfen keine Module oder sonstige Einzelteile ausgetauscht werden.
- Zum Abgleich sind ausschließlich Kunststoffwerkzeuge zu benutzen (keine Metallwerkzeuge verwenden). Dadurch wird vermieden, daß ein Kurzschluß entstehen kann oder eine Schaltung instabil wird.

ANMERKUNGEN

- Die Gleichspannungen und Oszillogramme sind gegen Gerätemasse zu messen.
- Die Gleichspannungen und Oszillogramme angeführt in den Schaltbildern sollen unter folgenden Bedingungen gemessen werden: Farbbalkensignal, Bildträger auf 503.25 MHz (C25)
- Die Oszillogramme und Gleichspannungen sind in RECORD oder PLAY gemessen.
- Die in den Stücklisten aufgeführten Bauteile sind positionsweise voll auswechselbar gegen die Bauteile im Gerät, ungeachtet der etwaigen Typenbezeichnungen.

– AVERTISSEMENTS

– Les normes de sécurité exigent qu'aprés réparation l'appareil soit remis dans son état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués $ ou

– Tout les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharger statiques (ESD). Leur longévité pourrait étre considérablement écourté par le fait qu'aucune précaution n'est prise à leur manipulation. Lors de réparations s'assurer de bien étre relié au méme potential que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

– Toujours alimenter un appareil à réparer à travers un transfo d'isolement.

– Ne jamais remplacer les modules ni d'autres composants quand l'appareil est sous tension.

– Pour l'ajustage, utiliser des outils en plastique au lieu d'instruments métalliques. Ceci afin d'éviter les court - circuits et exclure l'instabilité dans certains circuits.

OBSERVATIONS

– La mésure des tensions continues et des oscillogrammes doit se faire par rapport à la terre de l'appareil.

– La mésure des tensions continues et des oscillogrammes figurant sur le schéma doit se faire dans un signal de barre couleur porteuse image sur 503.25 MHz (C25).

– Les oscillogrammes et tension sont mésurées en mode RECORD ou PLAY.

– Les semi-conducteurs indiqués dans le schéma de principe et à la liste des compostants, sont interchangeables par repère sur ce chassis avec les semi-conducteurs de l'appareil quelle que soit la désignation de type donnée sur ces semi-conducteurs.

VEILIGHEIDSINSTRUCTIES

– Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, indentiek aan de oorspronkelijke, worden toegepast. De veiligheidsonderdelen zijn aangeduid met het symbool $ of

– Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor, dat U tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

– Sluit een apparaat dat gerepareerd wordt altijd via een scheidingstransformator aan op de netspanning.

– Verwissel nooit modules of andere onderdelen terwijl het apparaat is ingeschakeld.

– Gebruik voor het afregelen plastic i.p.v metalen gereedschap. Dit om mogelijke kortsluiting te voorkomen of een bepaalde schakeling instabiel te maken.

OPMERKINGEN

– De gelijksspanningen en oscillogrammen dienen gemeten te worden ten opzichte van de apparaat aarde.

– De gelijksspanningen en oscillogrammen vermeld in de schema's dienen gemeten te worden met een kleurbalkensignaal beelddraaggolf op 503.25 MHz (C25).

– De oscillogrammen en gelijksspanningen zijn in RECORD of PLAY mode gemeten.

– De halfgeleiders, die in het pricipeschema en in de stuklijsten, zijn vermeld, zijn per positie volledig uitwisselbaar met de halfgeleiders in het apparaat, ongeacht de typeaanduiding op deze halfgeleiders.

AVISOS

– Las instrucciones de seguridad exigen que, después de la reparación, el aparato se encuentre en el estado original y que las piezas de repuesto, utilizadas para la reparación, sean idénticas a las originales.
Los componentes de seguridad están marcados con $ o

– Todos los IC y semiconductores son sensibles a descargas electrostáticas (ESD). Un tratamiento no conforme a las instrucciones de semiconductores, en caso de reparación, podría llevar a la destrucción de estos componentes o a una reducción drástica de la duración. En caso de reparación tenga cuidado de que esté al mismo potencial que la masa del aparato, por una pulsera con resistencia. Ponga todos los componentes, herramientas y recursos al mismo potencial.

– Para reparar un aparato hay que conectarlo siempre a la alimentación a través de un transformador de aislamiento.

– Cuando un aparato está en marcha no pueden ser cambiados módulos u otras piezas de repuesto.

– Para los ajustes hay que utilizar exclusivamente herramientas de plástico (nunca herramientas metálicas). Así se evitarán cortocircuitos y circuitos inestables.

NOTAS

– Hay que medir las tensiones continuas y los oscilogramas contra la masa del aparato.

– Las tensiones continuas y los oscilogramas mencionados en los esquemas tienen que ser medidos de la manera siguiente: señal barra de color portadora de imagen en 503.25MHz (C25).

– Los oscilogramas y las tensiones continuas son medidas en "RECORD" y "PLAYBACK"

– Los componentes mencionados en las listas se los puede cambiar por los componentes en el aparato, a pesar de eventuales designaciones de tipos.

AVVERTIMENTI

– Le prescrizioni di sicurezza richiedono che l'apparecchio sia ricondotto alle condizioni originali e che siano usati ricambi originali.
Componenti di sicurezza sono marcati con $ o

– Tutti gli IC e semiconduttori sono sensibili a scariche elettrostatiche (ESD). Noncuranze durante la riparazione di semiconduttori possono danneggiarli o condurre ad una riduzione drastica della durata. Durante la riparazione assicurarsi di essere collegati allo stesso potenziale attraverso un bracciale di protezione contro scariche elettrostatiche. Inoltre tenere anche tutti i componenti e gli attrezzi a questo potenziale.

– Apparecchi da riparare bisogna collegarli sempre via un trasformatore isolante (separatore) alla tensione normale.

– Non scambiare moduli o altri componenti quando l'apparecchio è in funzione.

– Per l'accordo usare soltanto attrezzi di plastica (non usare attrezzi metallici). Cosí si evitano cortocircuiti e collegamenti instabili.

OSSERVAZIONI

– Misurare le tensioni continue e gli oscillogrammi riferiendosi alla massa dell'apparecchio.

– Le tensioni continue e gli oscillogrammi indicati negli schemi di collegamento devono essere misurati secondo le condizioni seguenti: segnale barre colore, portante dell'immagine su: 503.25 MHz (C25).

– Gli oscillogrammi e le tensioni continue sono misurati in RECORD o PLAYBACK.

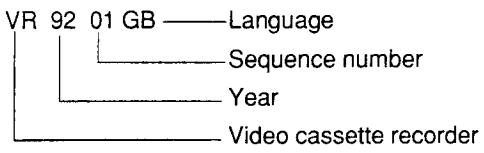
– I semiconduttori che sono menzionati negli schemi e nelle liste sono intercambiabili con quelli di pari tipo nonostante siano montati in posizione diversie.

DESCRIPTION OF THE SYSTEM USED FOR PUBLISHING MODIFICATION DATA AND SUPPLEMENTS TO THE SERVICE MANUAL.

All modification data and supplements to the Service Manual are published by means of Service Information bulletins.

Each Service information has a number, for example:

Example :



A Service Information bulletin concists of a front sheet, as the case may be followed by supplementary and/or replacement sheets.

Replacement sheets serve to replace existing sheets in the Service Manual. These sheets are identified by an additional letter after the page number, for example 5-1a. Page 5-1a then takes the place of page 5-1.

Supplementary sheets are inserted between the existing sheets in the Service Manual. These sheets can be identified by an additional figure following the page number, for example 5-1-1.

Sheet 5-1-1 should be inserted after page 5-1.

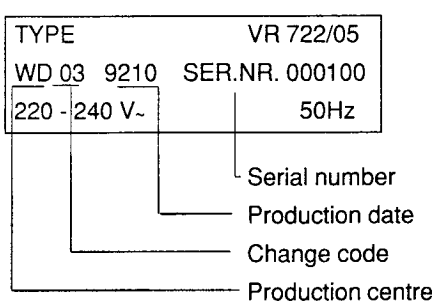
Description of the system by means of which modifications are indicated in the recorder.

All important parts of the recorder, such as tape deck, p.c. boards and modules, are provided with a sticker. These stickers specify a number of product data. The meaning of this data will now be explained for the most important sections.

The complete recorder

The type plate is located at the back of the recorder, below an example of such a type plate is given.

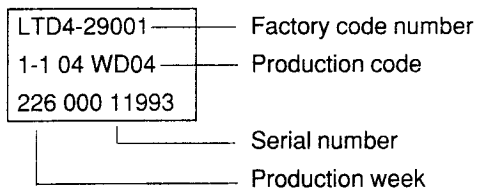
Type plate:



Note:

In the case of an important modification to the recorder the productionscode on the type plate is increased by one. E.g. 00 becomes 01.

Tape deck

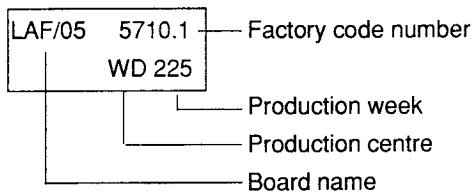


Note:

The production code and the serial number on the tape deck need not correspond to the production code and the serial number on the type plate.

Printed panels
The stickers are generally located on the track side of the module.

Example :



Remarks:

The production status number will not always be mentioned.

In case of an important modification, the last figure of the factory code number (point number) is increased by one. E.g. 5710.1 becomes 5710.2.

SURVEY OF SETS AND FEATURES

	VR722					VR7229	VR723	
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PAL B/G		•		•	•	•	•	
SECAM L						•		
PAL I			•					•
Video LP		•	•	•	•	•	•	•
FM - Audio		•	•	•	•	•	•	•
NICAM			•		•			•
German Stereo		•		•	•	•	•	
Audio dubbing		•	•	•	•	•	•	•
Test picture		•						
TXT/VPT	1-18						•	•
OSD			•	•				
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Fine tuning		•	•	•	•	•	•	•
Tuner mode	1-25	•	•	•	•	•	•	•
View mode	1-27	•	•	•	•	•	•	•
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* Today not included

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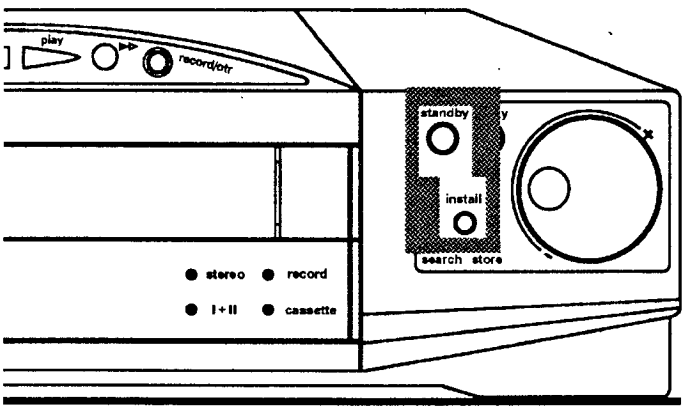
Setting the display language and the clock

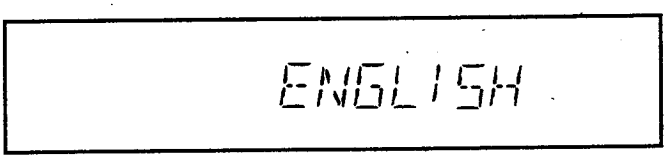
1. Switch off the video recorder with button STANDBY and press button INSTALL.

2. Switch on the TV set and select the programme number for the video recorder.

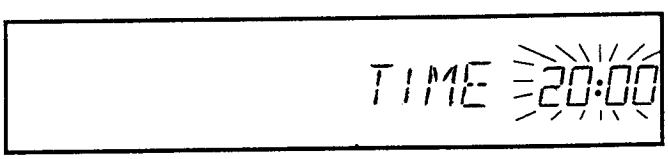


The test picture will appear on the TV set, and the display on the video recorder will show:

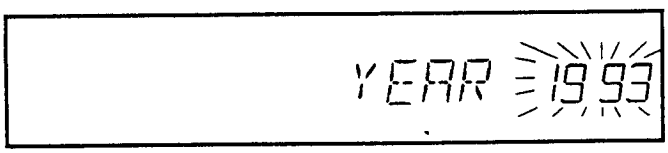
3. Press the INSTALL button.
   Use the rotary control to select the display language of your choice, e.g. 'ENGLISH'.



4. Press button INSTALL again. The display will show 'TIME'.
   Now use the rotary control to set the current time.

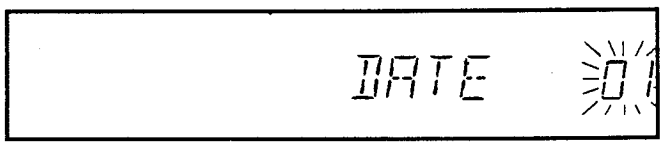


5. Press button INSTALL again. The display will show 'YEAR'. Now set the current year.



6. Press button INSTALL again. The display will show 'MONTH'. Now set the current month.

7. Press button INSTALL again. The display will show 'DATE'. Set today's date.

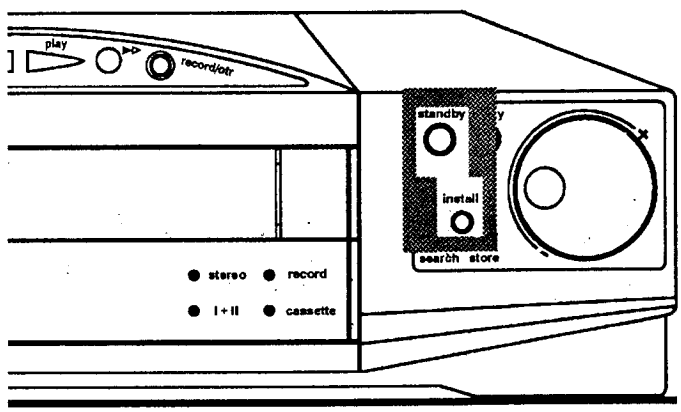


8. Press button INSTALL again. You have now finished setting the display language and the clock.

For sets with TXT

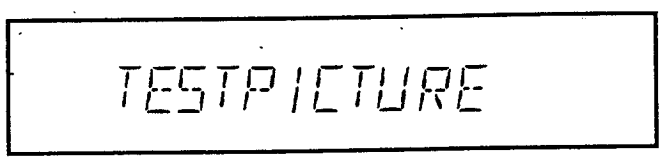
1. Switch off the video recorder with button STANDBY and press button INSTALL.

The buttons are located behind a cover on the right side of the front of the video recorder.

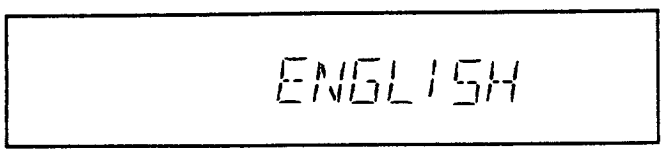


2. Switch on the TV set and select the programme number for the video recorder.

The test picture will appear on the TV set, and the display on the video recorder will show:

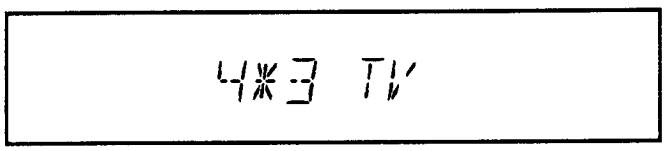


❸ Now press the green button ◎ on the remote control. Use the coloured buttons ◎ to select the display language of your choice, e.g. 'ENGLISH'.

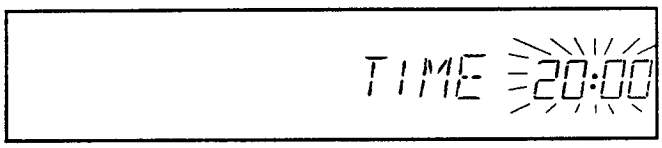


❹ In this step you can specify the screen format of your TV set.
If you are using a TV set with a normal screen format, then use the green ◎ button on the remote control to confirm the specification '4:3'.

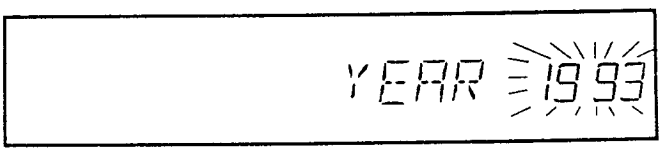
If you have one of the new wide screen TV sets, use the blue ◎ button on the remote control to switch over to the '16:9' format. Finally, press the green ◎ button to confirm.



❺ A survey page for entering the time and date will now appear on the TV screen. Now set the current time. To do this, use buttons 0-9 on the remote control.

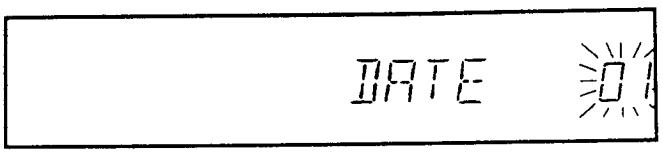


❻ Press the green button ◎ again. Now set the current year.



❼ Press the green button ◎ again. Now set the current month.

❽ Press the green button ◎ again. Now set today's date.

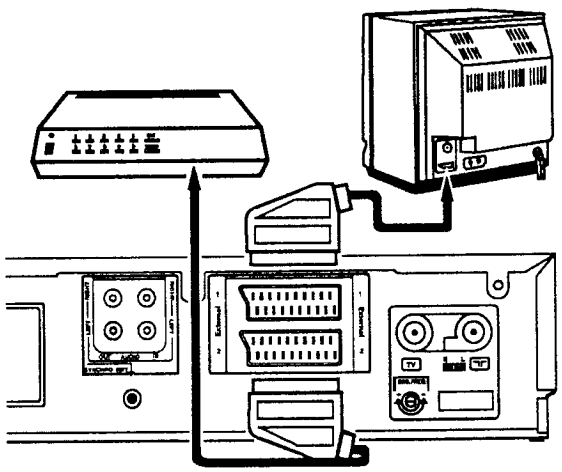


❾ Press the green button ◎ again. You have now finished setting the display language and the clock.

Connecting a decoder

Some TV broadcasters transmit encoded TV signals which you can only see with a bought or hired decoder. You can connect such a decoder (descrambler) to this video recorder.

❶ Use an AV-Euro-cable to connect the decoder to the video recorder (socket EXTERNAL 2).
You will find a description of how to store TV channels with the 'decoder' in the chapter **'Storing TV channels'** .



Note: * If you have tuned the video recorder and TV set to different TV channels, you can only use the decoder for one of them.
* Select on the video recorder a programme number that was linked to the 'DECODER' function when you were storing the TV channels. The video recorder then automatically uses the decoder.
* When you are buying the decoder, ask about the right channel number for the TV station. This will make it easier for you when you install it later.

Automatic channel search

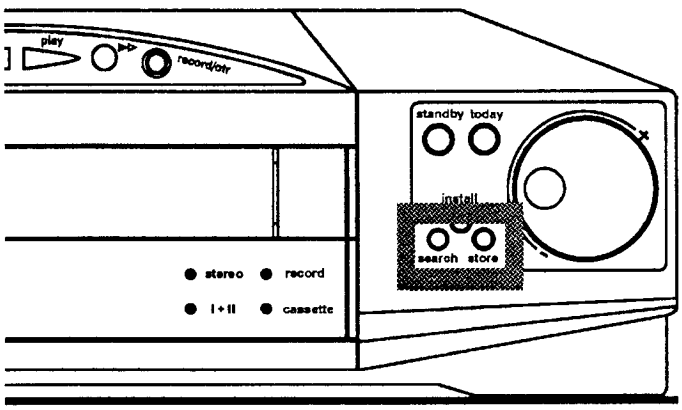
❶ Switch on the TV set and select the programme number for the video recorder.

❷ Switch on the video recorder with button STOP ■.

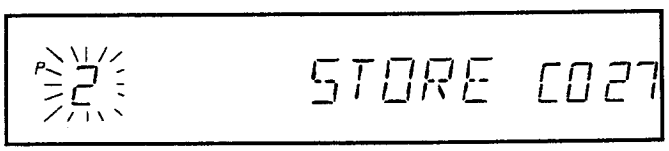
❸ Press button SEARCH.

For sets with TXT

You can perform the following operations not only with the buttons on the video recorder as in the following description, but, also, with the assistance of the user guide on the TV screen and the four coloured buttons ◎ on the remote control.



When the automatic channel search finds a TV channel, its picture will appear on the TV screen. The display will show, e.g.:



Have you used an AV-Euro-cable to connect the video recorder to your TV set and does your TV set respond to the switch-over with button MONITOR (remote control)? If so, you can now switch to and fro between TV reception and video recorder reception. This is the easiest way for you to assign the same TV channels to the same programme numbers on both appliances.

If this is not the required TV channel, or if the picture quality is poor, press button SEARCH again. The video recorder then searches for the next TV channel.

If this TV channel is encoded and the video recorder is connected to a decoder, press button SELECT (remote control). The display will show 'DECODER'.

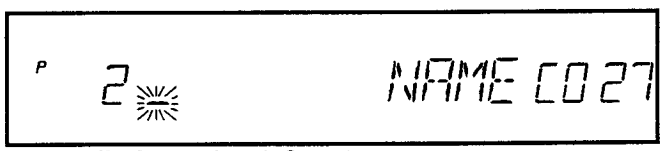
From now on, the video recorder will activate the decoder function for this TV channel (= this 'programme number').

❹ The video recorder will propose a programme number under which to store the TV channel (e.g. 'P 2' in the diagram). If you wish to store it under another programme number, use the rotary control ⊖⊕ to change it.

Note: The programme number proposed by the video recorder will automatically increase by one each time a TV channel is stored.

❺ If the programme number is correct, store it by pressing button STORE.

❻ Now you can give the TV channel a name (e.g. 'BBC 1') or change the present name. This TV channel name will appear in the display whenever you select this TV channel.
If you do not wish to give a name, go directly to step ❼.



Use the **remote control** to enter the name. Proceed as follows:

* Press button ⊞ or ⊟ to select the desired numbers or letters.

* By pressing button SELECT you can choose the position where you want to place the character (up to 5 characters are possible).

* By pressing button CLEAR you can reset the chosen position to a 'blank space' or delete the contents.

❼ Press button STORE on the video recorder to conclude.

❽ Repeat steps ❸ to ❼ until you have stored all the TV channels that you want.

Direct channel storage

❶ Switch on the TV set and select the programme number for the video recorder.

❷ Switch on the video recorder with button STOP ■.

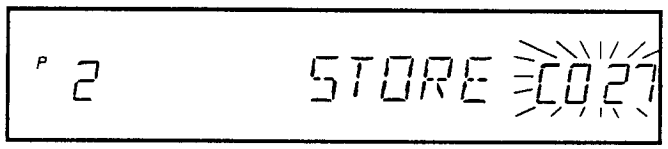
❸ Use the rotary control ⊖⊕ to select the programme number under which you wish to store the TV channel.

❹ Press button STORE.

For sets with TXT

You can perform the following operations not only with the buttons on the video recorder as in the following description, but, also, with the assistance of the user guide on the TV screen and the four coloured buttons on the remote control.

A flashing channel number will be displayed:



Use the rotary control or the digit buttons 0-9 on the remote control to select the desired channel number.

If this TV channel is encoded and the video recorder is connected to a decoder, press button SELECT (remote control). The display will show 'DECODER'.

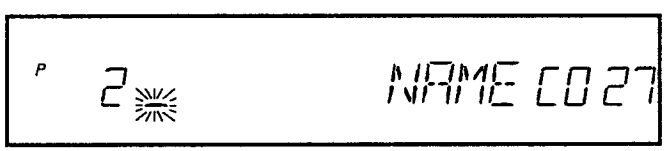
From now on, the video recorder will activate the decoder function for this TV channel (= this 'programme number').

❺ A TV channel now appears on the TV screen.

Have you used an AV-Euro-cable to connect the video recorder to the TV set and does your TV set respond to a switch-over with button MONITOR (remote control)? In this case, you can now switch to and fro between TV reception and video recorder reception. This is the easiest way for you to assign the same TV channels to the same programme numbers on both appliances.

When you have found the right TV channel, store it with button STORE.

❻ Now you can give the TV channel a name (e.g. 'BBC 1') or change the present name. This TV channel name will appear in the display whenever you select this TV channel.
If you do not wish to give a name, go directly to step ❼.



Use the **remote control** to enter the name. Proceed as follows:

* Press button + or − to select the desired numbers or letters.

* By pressing button SELECT you can choose the position where you want to place the character (up to 5 characters are possible).

* By pressing button CLEAR you can reset the chosen position to a 'blank space' or delete the contents.

❼ Press button STORE on the video recorder to conclude.

❽ Repeat steps ❸ to ❼ until you have stored all the TV channels that you want.

Cable TV with special channel numbers

If you possess cable TV equipment with special channel numbers, you must enter the channel numbers already defined for the special channels.
Proceed as described in the section 'Direct channel storage'. In step ❹, enter the channel numbers (e.g. channel '080' for special channel 'S1') according to the following table.
Further information about the special channel numbers of your TV channels is available from your cable TV supplier.

Special channel/channel number (Hyperband)

S1	080	S11	090	S21	100	S31	110
S2	081	S12	091	S22	101	S32	111
S3	082	S13	092	S23	102	S33	112
S4	083	S14	093	S24	103	S34	113
S5	084	S15	094	S25	104	S35	114
S6	085	S16	095	S26	105	S36	115
S7	086	S17	096	S27	106	S37	116
S8	087	S18	097	S28	107	S38	117
S9	088	S19	098	S29	108	S39	118
S10	089	S20	099	S30	109	S40	119
						S41	120

The single frame/scanning (JOG/SHUTTLE) function:

On the remote control you will find a large rotary control.

❶ First switch on the function with button JOG ON. The green lamp will light up.

❷ Turn the inner (jog) dial to select the next single frame forwards or backwards (JOG function).

By turning the outer (shuttle) ring of the rotary control during playback, you can select picture search in several steps forwards and backwards (SHUTTLE function).

Proceed with the SHUTTLE function as follows:

❶ Press button ▶.

❷ Switch on the JOG/SHUTTLE function with button JOG ON. The green lamp will light up.

❸ Starting at the central setting ('STILL'), turn the outer ring to the right. You can select from the following scanning speeds:
+1/6, +2 +5, +7, +9, +11.
If you turn it to the left, the speeds are:
-1/6, -1, -3, -5, -7, -9, -11.

Note: If the still picture vibrates vertically, press button TRACKING ▶ until the vibration disappears.
If you pass the optimum setting, you can repeat this step with button TRACKING ▶.

Synchronous Editing (Synchro-Edit)

You can edit synchronously with a connection cable between an appropriately equipped camcorder and the video recorder. For example, cable SBC1085 + SBC5512 for Variant 1.
Both appliances are started at the right time with the help of a synchronized pulse and the adjustable pre-roll time.
Pay attention to the operating instructions for your camcorder. The video/audio signal enters the video recorder via the socket EXTERNAL 2.

❶ Press button REC.MODE several times until 'EDIT' appears in the display.

❷ You can change the pre-roll time with the buttons + or −. The display will show, e.g. 'START 1:56' (seconds).

For sets with TXT

❶ Press the menu button INFO ⓘ. Use the red or blue button ◉ to select the line 'RECORD MODE' in the menu. Confirm this with the green button.

❷ Use the red or blue button ◉ to select the desired recording mode 'EDIT' in the sub-menu. Confirm this with the green button.

You can change the pre-roll time with the buttons + or −. The display will show, e.g. 'START 1:56' (seconds).

❸ Confirm your setting with button STOP ■.

❹ Locate the right tape position on the video recorder for recording. Press button STOP ■ again.

❺ Locate the right tape position on the camcorder.

❻ Press button 'PAUSE' on the camcorder.

❼ In accordance with the above cabling, there are two ways to start editing.

Variant 1

❽ Start the editing process with button RECORD / OTR on the video recorder. The camcorder starts with 'PLAYBACK' and the video recorder starts synchronously with 'RECORD'.

❾ Stop the recording with button STOP ■ on the video recorder.

Variant 2

❽ Start editing, e.g. with button 'EDIT' on the camcorder. The camcorder starts with 'PLAYBACK' and the video recorder starts synchronously with 'RECORD'.

❾ Stop the recording with button 'PAUSE' on the camcorder.

❿ Switch off the video recorder with button STANDBY.

Note: If the start of the scene to be edited is missing, then the setting for the pre-roll time is too long. Simply set a shorter time (e.g. 1:40) as described in step ❷. If the recording starts before the scene to be edited, the setting for the pre-roll time is too short. Then you must increase the set time, e.g. to 2:10.

To programme a TV programme that is on every day or every week:

You don't have to programme a series each time afresh. When you are entering the recording date, you can programme a daily or weekly repeat at the same time.
Programme the TIMER block as usual. Press button SELECT when you are entering the recording date in step ❶.

In addition to 'DATE', the display will show:

Press once	=	'D' for recording every day (**D**aily)
Press twice	=	'W' for recording every week (**W**eekly)

Some general notes: * The TIMER switches on the video recorder automatically only if the video recorder is **switched off** at the start time of the programmed recording.
* If you don't press any button for one minute during programming, the remote control automatically interrupts the process. You then have to begin programming anew.
* The contents of the TIMER block remain stored in the remote control as long as you have transmitted the data to the video recorder. If, after entering the end time, you do not wish to transmit the data to the video recorder, press button STANDBY.
* While a programmed recording is being made, you cannot use the video recorder manually.
If you want to interrupt the programmed recording, press button STANDBY.
* If the end of the cassette is reached during a programmed recording, the video recorder automatically ejects the cassette and switches off.
* If you forget to load a cassette after programming, the word 'EJECT' appears in the display of the video recorder.
* If you insert a cassette with erase protection for the recording, the indication 'PROTECTED' appears for a few seconds in the display of the video recorder.
The cassette is then ejected.
* If you have programmed all TIMER blocks, the display of the video recorder will show 'MEMORY FULL'.
* The programmed recording is always made at the recording speed (SP/LP) that **has just been** selected on the video recorder.

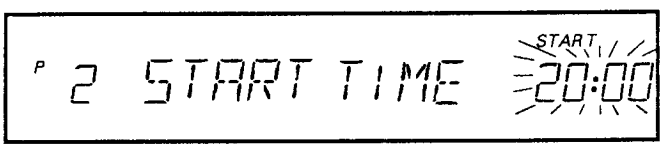
TODAY programming

It is very easy to programme a recording for TODAY. You only need to enter the programme number and the start time.
Please note that only **one** TODAY programming is possible per day.
The recording will be made until the end of the loaded cassette.
Note: You cannot use the PDC function with TODAY programming.

1. Press button TODAY.
   The programme number currently selected will flash in the display:

Use the rotary control or the digit buttons 0-9 (remote control) to select the programme number of the TV channel from which you want to record.

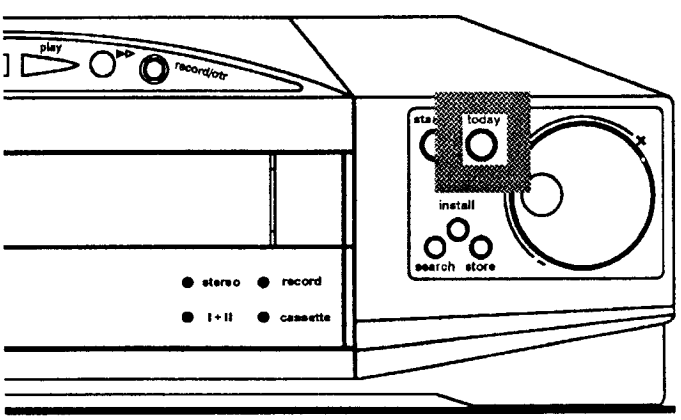
2. Press button TODAY again. The start time flashes in the display:



Enter the start time.

3. To finish, press button TODAY again.
   If you only want to check the data, you can end this process with button STANDBY.

Important note: The TIMER only switches on the video recorder automatically if it is **switched off** at the start time of the programmed recording.
Make sure that the video recorder is always switched off with button STANDBY after use.

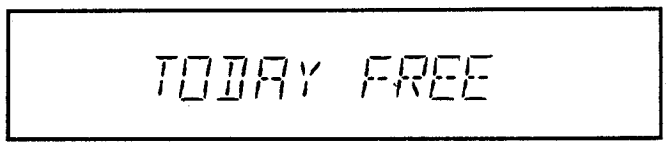


Cancelling TODAY programming

1. Press button TODAY on the remote control and then button CLEAR.

2. Press button TODAY again.

To confirm this, the display shows the following for a few seconds:



3. You have now cancelled the programming.

How can I check or correct a TIMER block?

1. Press button TIMER VCR on the remote control.

2. Use button + or − to select the TIMER block that you wish to check or correct.

3. Now press button TIMER VCR several times.
   The recording date, the programme number, the start time and the end time will be displayed one after another on the video recorder.
   You can change all data with button + or − or with the digit buttons 0-9.

4. Finally, press button TIMER VCR again. If you have made any corrections, the data is now up to date.

For sets with TXT

1. Press the menu button INFO on the remote control. Confirm the first menu line 'TIMER' with the green button.

2. Use the red or blue button to select the TIMER block that you want to check or correct.

3. Now press the green button several times. The recording date, the programme number, the start time and the end time will appear one after another on the video recorder.
   You can change all data with button + or − or with the digit buttons 0-9.

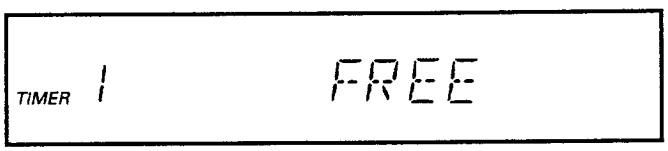
PDC Notes: * You cannot correct a TIMER block programmed with PDC. Should you try to make a correction, PDC switches itself off automatically.
* If you are checking a TIMER block that has been programmed with a 'SERIES CODE', you will recognize this by the different programme steps ('PROG SERIES' and 'PAGE SERIES'). Only the programme number , the title and the TXT-subtitles page number can be changed, as required. If you change any other data, the PDC function switches itself off automatically.

How can I cancel a TIMER block?

1. Press button TIMER VCR on the remote control.
2. Use button + or − to select the TIMER block that you want to cancel.
3. Press button CLEAR and the TIMER block is cancelled. The display on the video recorder will show, e.g.:

For sets with TXT

1. Press the menu button INFO on the remote control. Confirm the first menu line 'TIMER' with the green button.
2. Use the red or blue button to select the TIMER block that you want to cancel.
3. Cancel the TIMER block with the button CLEAR. The display of the video recorder will show, e.g.:

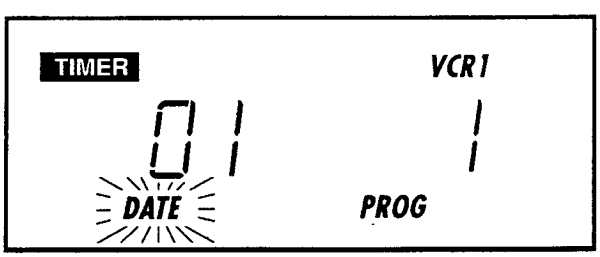


Programming on the remote control

You can enter and store the data for **one** recording in the remote control.
The remote control display shows you all the programming steps. Use the digit buttons 0-9 or button + or − to enter the data.
With the last press of the button you transmit the programmed data to the video recorder. The data will be stored in the next free TIMER block of the video recorder.
Make sure that you have not inserted a cassette with erase protection.

1. Press button TIMER RC.

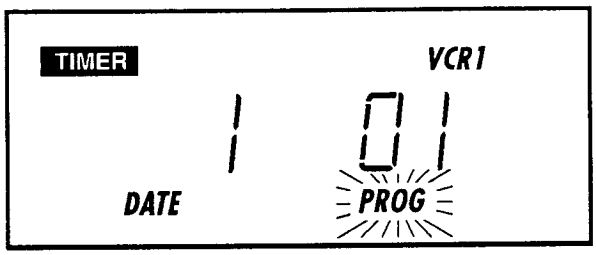
The remote control display will show, e.g.:



The data last entered will appear.
Now enter the date on which the recording is to be made.

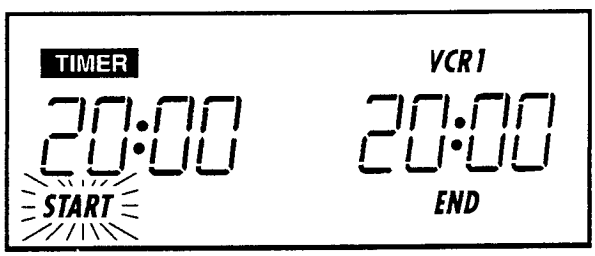
If the display **also** shows the indicator 'D' or 'W', press button SELECT one or more times until **only** 'DATE' is shown.

2. Press button TIMER RC. The display will show e.g.:



Now enter the programme number of the TV channel from which you want to record.

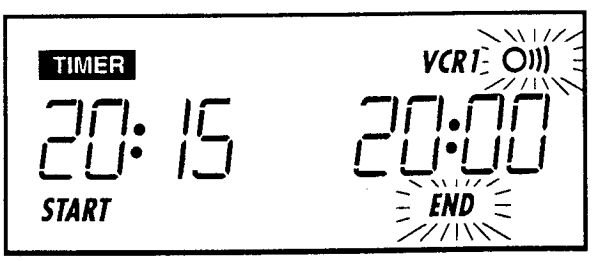
3. Press button TIMER RC again. The display will show, e.g.:



Now enter the start time of the recording.

Some important notes on VPS: You can switch VPS on and off with button SELECT. Take note of the VPS details beside the individual TV programmes in your TV guide. If the TV guide gives a VPS time code that differs from the start time of a TV programme you have programmed, e.g. '20.15 (VPS 20.14)', you have to enter the VPS time code '20.14' as the start time when programming.
A VPS-controlled recording can only work if the exact VPS time code is entered.
If you want to enter a time that differs from the VPS time code, you have to switch off VPS with button SELECT.

4. Press button TIMER RC. The display will show e.g.:



Now enter the end time of the recording.

❺ Transmit the data to the video recorder. To do this, point the remote control at the video recorder and press button TIMER RC ❺.

The programmed data is now sent to the video recorder. If the video recorder has correctly received the data, the video recorder display shows, e.g.:

Programming is now complete. The data has been stored in a TIMER block (e.g. 'TIMER 1').

Programming with TXT/VPT

Programming is much easier if you use the coloured TXT buttons, the user guide on the TV screen and the page storage. Details of the general operation of the TXT decoder can be found further on in the chapter **'Special features and extras'**.

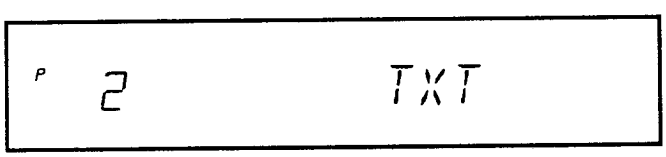
❶ Switch on the TV set and select the programme number for the video recorder.

❷ Insert a cassette. Switch on the video recorder with button STOP ■.

❸ Now select the programme number of the TV channel from which you want to make a programmed recording. Use the digit buttons 0-9 or button + or − on the remote control.

❹ Switch on the TXT-decoder with button VPT (remote control).

The display of the video recorder will show, e.g.:



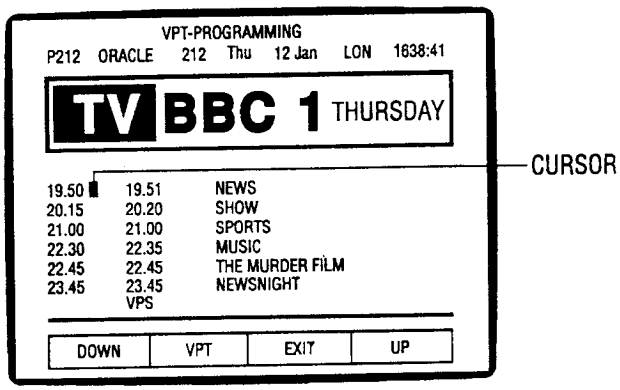
On the screen of your TV set you will see Page 100 or, if you have already stored favourite TXT pages (see step ❻), the first favourite TXT page.

❺ You can use the blue or red button (remote control) to select the other favourite TXT pages or the digit buttons 0-9 to select the three digit number of the page on which this TV channel's programmes are listed.

❻ Press button SELECT if you want to store this page number for future programming. Confirm the page number with the green button. By pressing the blue button you will return to the TXT-page.

❼ Press button VPT.
You can now see a little square position marker (the 'cursor') on the survey page.

The TV screen will show, e.g.:



You can move the cursor up and down with the blue or red button.
Position the cursor at the start time of the TV programme that you want to record.

❽ Press button VPT.
Note: If this TV station transmits a PDC 'series code', you can record all episodes of a TV series in one operation. Select and confirm your choice with the coloured buttons. If you select 'THE WHOLE SERIES', this will be indicated in the survey of all TIMER blocks by the additional information 'SERIES'.

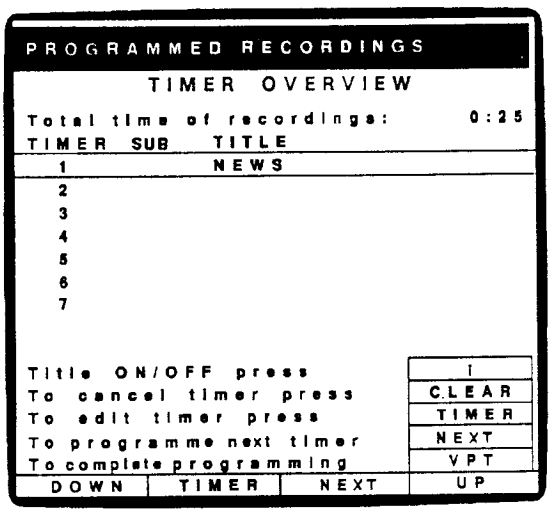
There are now two possibilities:

❾ **Variant 1**
On the TV screen you now see the **contents** of the TIMER block.

The programme number is on a green background. You can change the programme number with the digit buttons 0-9. With the green button you can confirm that the programme number is correct. Thus, you arrive at 'Variant 2'.

Variant 2
On the TV screen you now see a **survey** of all stored TIMER blocks.

The survey now displayed on the TV screen:



❿ If you wish to continue programming, press the yellow button . You then start again at step ❼.
To conclude, press button VPT. Programming is now complete.

⓫ Switch off the video recorder with button STANDBY.

Special notes: In step ❾ you have the possibility of entering additional functions in the TIMER programming:

Press the green button to enter the TIMER block. Every time you press the green button from now on, the indicator will jump one field further. Use the yellow button to select the functions, and the digit buttons 0-9 to change the data.

Display	**Function**
DATE	Recording repeated daily/weekly
PROGRAMME	Simulcast, audio
SUBTITLE PAGE	TXT page number
STARTING TIME	PDC off
TITLE RECORDING	Title recording on/off (displays for a few seconds the TXT title, TV channel name, time and date in the recording)

Title recording:

In step ❾ you can also programme the title of the TV programme to be included in the recording. This programme title will be displayed briefly at the beginning of the recording.

❶ Select 'TO EDIT TIMER' by pressing the green button . You can now change (edit) the individual TIMER data.

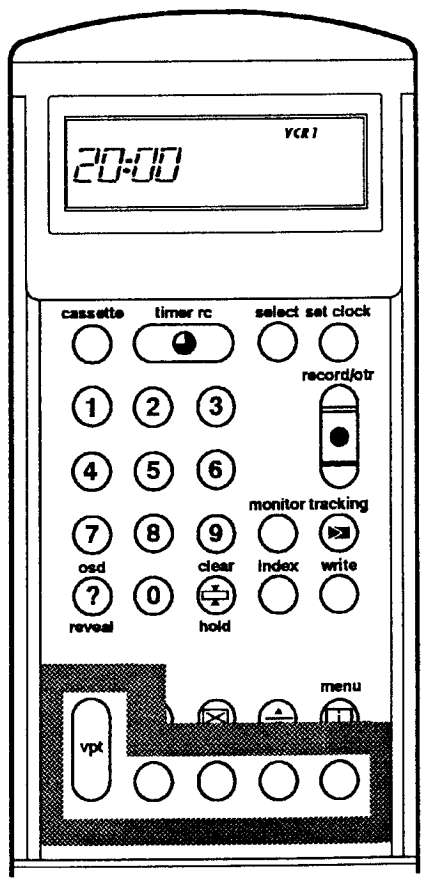
❷ Press the green button several times until you are in the line 'TITLE RECORDING'. Use the yellow button to switch to 'TITLE RECORDING ON' if this has not already been done.

❸ Press the blue button . You are now in the 'TITLE EDITING' screen. When programming TXT you see the text line, taken automatically from TXT, which you can change.

❹ Now enter the desired characters and then press the green button .

❺ Press button VPT to end programming.

Notes: * If a TV transmission is re-scheduled, 'PDC' **automatically** changes the start time and date information in the TIMER block. This is not a fault in your video recorder.
* The TIMER switches on the video recorder automatically only if the video recorder is **switched off** at the start time of the programmed recording.
* If a PDC programmed recording is not made, this could be because the PDC data from the TV station is incorrect or because the aerial installation is of poor quality.



TXT Decoder. Reading TXT with the video recorder

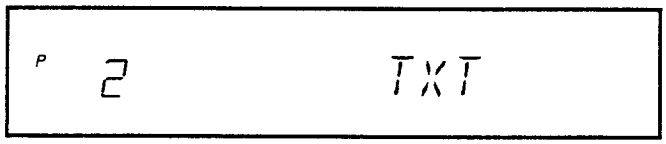
With this video recorder, you can receive the TXT programmes broadcast in your country (Supertext / Fastext / Videotext / Teletext / Top / Flof, etc.) even if your TV set does not have TXT. Apart from the extensive range of facililities provided by TXT, this function offers you two further advantages:

- You can use the video recorder to insert and record TXT subtitles.

- When you are programming recordings you can make use of the TXT programme survey pages.

How can I read TXT?

1. Switch on your TV set and select the programme number you have stored for video playback.
2. Switch on the video recorder with button STOP ■.
3. Now select on the video recorder the TV channel whose TXT pages you want to read. To do this, press button + or − or the digit buttons 0-9 on the remote control.
4. Use button TXT on the remote control to switch on the TXT decoder. The video recorder is now receiving the TXT of the TV channel you chose.
   The display of the video recorder shows, e.g.:



On the TV screen you will see the first TXT survey page, which is usually the index. The TXT information line will be included on the upper edge of the TV screen.

5. Now you can call up the TXT pages that you want to read.
   Use the digit buttons 0-9 to enter the number of the desired TXT page. You must always enter this number as three digits.

The page number you enter appears in green in the upper information line on the TV screen. After a few seconds search time, the page you wanted will appear. If you want to read another page, just enter the new page number. You can use the coloured TXT buttons (on the remote control) to select directly the TXT page that you want to read. On the lower edge of the TV screen you will find the corresponding coloured notes.

If you want a survey of the entire range of information on offer with TXT, press button INFO. The TXT index defined for the TV channel then appears.

6. Switch off the TXT decoder with button TXT.
   You will then return to the normal TV channel.
7. Switch off the video recorder with button STANDBY.

An important note: When you switch on TXT, most of the other functions of your video recorder are blocked.

Can I store my 'favourite TXT pages'?

For each TV channel you can store up to four TXT page numbers, e.g. the news headlines or the daily TV programme survey. If you store the programme survey page here, programming with TXT will be much easier for you.

1. Switch on the TXT as usual with button TXT and select the page you want to have as a 'favourite TXT page'.
2. Press button SELECT. The TV screen will show you a survey of the 'favourite TXT pages' you have already stored. If you want to select, delete or interrupt another page number, press the corresponding coloured button.
3. To conclude, press the green button. You have now stored the page numbers.
4. Return to the TXT mode with button TXT.

How can I call up my 'favourite TXT pages'?

1. Switch on the TXT with button VPT. The first favourite TXT page will appear on the TV screen.
2. Use the blue or red button to select other favourite TXT pages. You can enter the page number directly with buttons 0-9.
3. Press button TXT to return to the normal video recorder mode.

The automatic use of the TXT clock by the video recorder:

Store a TV channel that transmits TXT on programme number 'P 1'. From now on, the video recorder takes the correct time from TXT.
Note: The date is not corrected automatically.

How can I record TXT subtitles?

1. Switch on the TXT with button TXT (remote control) and select the page number of the subtitles page.
2. Then start the recording as usual with button RECORD / OTR.

Some notes: You can only record the subtitles from the TXT information. If you select a normal TXT page and press button RECORD / OTR, the TXT information will be deleted.
While you are recording you cannot use TXT. You first have to interrupt the recording with button STOP ■.

Some other interesting TXT functions:

Switching off TXT temporarily:

You can use button SWAP on the remote control to switch off TXT temporarily. When you press button SWAP again, the TXT will appear again on the TV screen without you having to call it up.

To enlarge the print:

You can use button ENLARGE to double the print height on the TXT screen. Thus, you can, for example, still read TXT from further away.

1. Press button ENLARGE - the upper half of the page will appear enlarged on the TV screen.
2. If you press button ENLARGE again - the lower half of the page will appear enlarged on the TV screen.
3. Press button ENLARGE again when you want to view the whole TXT page in normal print height.

Calling up concealed information:

Some TXT pages (e.g. the quiz page) contain questions with concealed answers or information.

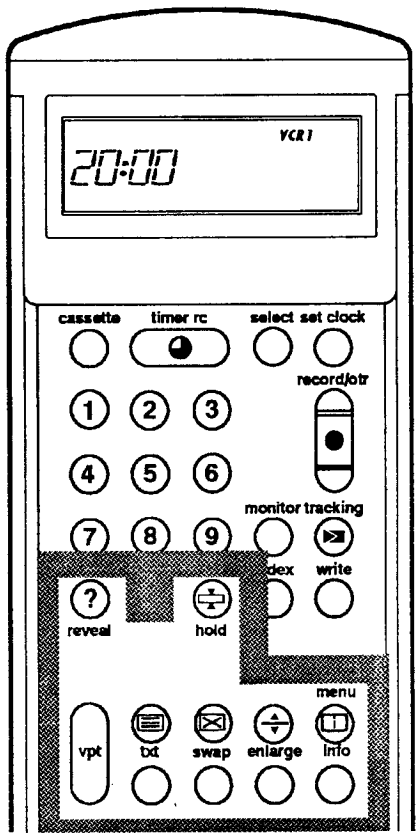
1. Press button ? to make the concealed information appear on the TV screen.
2. Press button ? once more to make the information disappear again.

TXT turns over pages automatically:

If a TXT page takes up more space than is available on the TV screen, this page number is divided into sub-pages, which are automatically turned over.

1. By pressing button CLEAR on the remote control you can stop the pages from being turned over, e.g. if you wish to take your time reading.
2. This sub-page will remain on the TV screen until you press button CLEAR again. Then the pages are turned over automatically again.

General notes: * There are no page numbers beginning with '0' or '9'. If you accidentally select '0' or '9' as the first digit, this error will be indicated by 'P?--' on the information line.
* If, while selecting a page number, you accidentally press a wrong digit button, you must nevertheless complete a combination of three digits. Only then can you enter the correct page number again.
* If the number of a chosen page remains green, this means that the TV channel is not transmitting this page at the moment.
* If you wish to change from one TXT channel to another, you first have to switch off the TXT decoder with button TXT.
Then select the number of the other TV channel whose TXT pages you want to see and switch on the decoder again with button TXT.



Simulcast recording

The stereo sound of some TV programmes is broadcast simultaneously on FM radio. In order to get the best stereo sound quality you can record the picture from the TV channel and simultaneously record the stereo sound from the radio.
To do this, connect the radio to the socket AUDIO IN using an audio cable.

1. Tune your radio and the video recorder to the desired programme.
2. Press button REC.MODE (remote control) until the display on the video recorder shows:

3. Press button RECORD / OTR.
The video recorder starts recording the sound from the radio and the pictures from the TV channel.

❹ Finish the recording with button STOP ■.

Notes: * Simulcast recording without a video signal is not possible.
* For a programmed simulcast recording, read the note in the Section 'Correcting/Cancelling a TIMER block'.

For sets with TXT

❷ Press the menu button INFO ⓘ. Use the red or blue button ◉ to select the line 'RECORD MODE' in the menu. Confirm this with the green button ◉.

❸ Use the red or blue button ◉ to select the desired recording mode 'SIMULCAST' in the sub-menu. Confirm this with the green button ◉.

❹ Press button RECORD / OTR
The video recorder starts recording the sound from the radio and the pictures from the TV channel.

❺ Finish the recording by pressing button STOP ■.

Notes: * Simulcast recording without a video signal is not possible.
* For a programmed simulcast recording, read the note in the Section 'Programming with TXT/VPT'. In step ❾ you can select the 'SIMULCAST' function with the yellow button ◉.

Externally controlled recording

Do you have another device, e.g. a satellite receiver, with a built-in clock through which other equipment can be controlled? With this video recorder, you can control the recording from an external device via the socket EXTERNAL 2.

❶ While the video recorder is switched off, press button MONITOR for five seconds. The display will show 'RECORD PREP'. The video recorder is now ready to record.

❷ The start and end of the recording is remote-controlled via socket EXTERNAL 2.

❸ If you want to interrupt this function, press button STANDBY.

Note: It is **not** possible to use a decoder with this function.

Auto-dimmer

You can choose the brightness of the display on the video recorder when it is switched off.
To do this, switch off the video recorder with button STANDBY ⏻ and use button + or − on the remote control to select the brightness you require.

The new 16:9 wide screen standard

This video recorder is suitable for wide screen TV sets.
If a wide screen '16:9' identification is received during a video recording from an external source (e.g.: MAC-decoder) via the EXTERNAL 2 socket, this identification is recorded too.

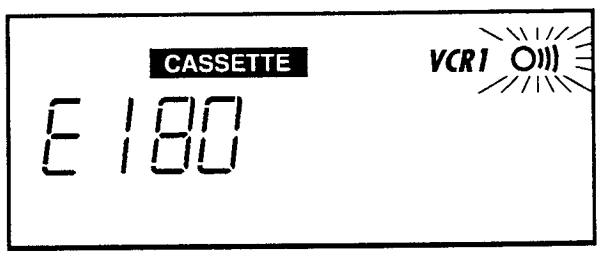
During playback, this identification is conveyed from the EXTERNAL 1 socket via an AV-Euro-cable to the TV set. If the TV set is not equipped for playing back wide screen pictures or cannot handle the identification, switch the video recorder to the normal 4:3 format. To do this, look it up in Chapter 1, section 'Setting the display language and the clock', step ❹.

Tape position. How do I know where I am on the tape?

It is handy to know for how long a cassette has already been playing or how long is still left.
To indicate this, your video recorder offers you three different display possibilities (in step ❹).

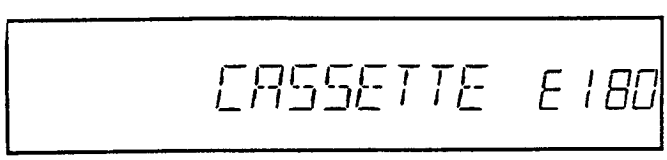
First, you must enter the tape length of the loaded cassette. This is necessary if the correct playing time is to be indicated. The tape length is given on the cassette in minutes, e.g. 'E180' corresponds to 180 minutes of playing time. You will find the length printed on the left of the front narrow edge. The actual length, however, may be a little longer than indicated.

❶ Press button CASSETTE on the remote control. A cassette length will appear in the display of the remote control, e.g.:



❷ Now press button + or − in order to select the right cassette length. The possibilities available appear in this order: E30, E60, E90, E105, E120, E150, E180, E195, E200, E210, E240, E260, E300, EC30, EC45, E30, etc.

❸ Point the remote control at the video recorder. Press button CASSETTE on the remote control.
In this way, you transmit the data to the video recorder. When it has received the data, the display will show, e.g.:

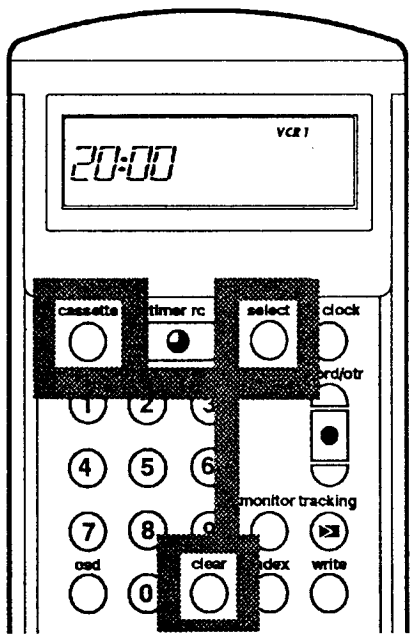


❹ Now you can use button SELECT on the remote control to select from the following **three display possibilities** :

elapsed playing time	:	Display U (= time used)
remaining playing time	:	Display R (= time left)
counter	:	Indication of tape position

You can read this display during winding and rewinding, during recording, playback and stop.
If you want to reset the counter indication of the tape position to '0', press button CLEAR.

Please also note: * With newly loaded cassettes, the video recorder must first calculate the playing time. The video recorder first shows, e.g. '-:--' and waits a few seconds before displaying the correct playing time.
* The time display works accurately only with PAL/SECAM-VHS cassettes.
Cassettes made for NTSC-VHS equipment do not show an exact time.



Insert function

This function enables you to insert a new scene into an existing recording without a disturbing transition.

❶ Locate the position at which you want to insert a scene with the button ▶.

❷ Press button STOP ■.

❸ Press button + or − or the digit buttons 0-9 (remote control) to select the programme number of the TV channel from which you want to record.

❹ Press button REC.MODE (remote control) until the display of the video recorder shows:

❺ Press button RECORD / OTR.

❻ Finish the recording with button STOP ■.

For sets with TXT

❹ Press the menu button INFO ⓘ. Use the red or blue button ◉ to select the line 'RECORD MODE' in the menu. Confirm this with the green button ◉.

❺ Use the red or blue button ◉ to select the desired 'INSERT' recording mode in the sub-menu. Confirm this with the green button ◉.

❻ Press button RECORD / OTR.

❼ Finish the recording with button STOP ■.

Selecting the audio track and audio mix

❶ Press button AUDIO to select the desired audio track: mono, stereo, language I, language II or audio mix. The video recorder display will show one of the following indications:

STEREO	for stereo sound
LEFT	for language I, left
RIGHT	for language II, right
MONO	for mono sound
MIXED	for audio mix (only with playback)

❷ You can switch from the one possibility to the next in the above sequence by pressing button AUDIO several times within five seconds.

For sets with TXT

❶ Press the menu button INFO ⓘ. Use the red or blue button ◉ to select the line 'AUDIO' in the menu. Confirm this setting with the green button ◉.

❷ Use the red or blue button ◉ to select the audio track that you wish to hear: mono, stereo, language I, language II or audio mix. The TV screen will show one of the following indications:

STEREO	for stereo sound
LEFT CHANNEL	for language I, left
RIGHT CHANNEL	for language II, right
MONO	for mono sound
MIXED	for audio mix (only with playback)

❸ Confirm your setting with the green button ◉.

Note: * If no stereo sound has been recorded on the cassette, the video recorder automatically switches over to mono sound.
* With the 'Audio Mix' function, you can play the mono sound of the normal ('linear') audio track together with the sound of the stereo audio track (see recording with 'audio dubbing').
* Stereo playback is only possible if the video recorder is connected to a stereo TV set or a Hi-Fi audio system via a connecting cable (socket 'EXTERNAL 1/2' or 'AUDIO OUT').

Additional note for sets without TXT

* It is possible that some TV stations will broadcast mono sound transmissions incorrectly in a bilingual mode (indicator I+II will light up).
If the sound quality is poor, switch to either 'language I' or 'language II'.

Audio dubbing

This function enables you to replace (dub) the sound track of a previously made recording with another sound recording (socket AUDIO IN).

Only the normal (linear) sound track is changed.

The stereo sound track and the video image remain unchanged.

❶ Press button PLAY to locate the position at which the audio dubbing is to start.

❷ Press button STOP ■. The video recorder is now in the 'STOP' position.

❸ Press button REC.MODE (remote control). The display on the video recorder will show:

For sets with TXT

❶ Press button PLAY to locate the position at which the audio dubbing is to start.
Press button STOP ■. The video recorder is now in the 'STOP' position.

❷ Press the menu button INFO ⓘ. Use the red or blue button ◉ to select the line 'RECORD MODE' in the menu. Confirm this with the green button.

❸ Use the red or blue button ◉ to select the desired recording mode 'AUDIO DUBBING' in the sub-menu. Confirm this with the green button.

❹ Press button RECORD / OTR.

The video recorder will start to record the sound input from the audio source, replacing the normal sound track. Audio output is controlled automatically.

❺ You can finish the recording with button STOP ■.

'Audio only' recording

You can also make 'Audio only' recordings (audio recordings) with this video recorder. To do this, connect the video recorder to an audio system (socket AUDIO IN).
The recording is made at half-speed. This gives you twice as much recording time as is indicated on the cassette.

❶ Insert a cassette.

❷ Press button REC.MODE until the display shows:

For sets with TXT

❷ Press the menu button INFO ⓘ. Use the red or blue button ◉ to select the line 'RECORD MODE' in the menu. Confirm this with the green button.

❸ Use the red or blue button ◉ to select the desired 'AUDIO ONLY' recording mode. Confirm this with the green button.

❹ Press button RECORD / OTR. The video recorder starts to record the sound input. Any previous (video) recording is, thereby, erased.

❺ Finish recording by pressing button STOP ■.

Note: For a programmed 'AUDIO ONLY' recording, proceed as for 'Programming with TXT/VPT'. In step ❾ select the 'AUDIO ONLY' function with the yellow button ◉.

Tuner mode.
Your video recorder as an extension of your TV set

You can also use your video recorder as a TV receiver (tuner). This is handy if your TV set does not have remote control or if it has fewer channel buttons than the number of channels it could actually receive.

This is how you go about it:

❶ Switch on the TV set. Select the programme number reserved for video playback.

❷ Press button TUNER on the remote control.
The display will show, e.g.:

For [illegible]

❷ Press the menu button INFO ⓘ on the remote control. Use the red or blue button ◉ to select the menu line 'TUNER MODE'. Press the green button ◉. Confirm 'TUNER MODE ON' with the green button.
The display will show, e.g.:

❸ Use the rotary control ⟲ or the digit buttons 0-9 (remote control) to select the TV channel that you want to see on the TV screen.

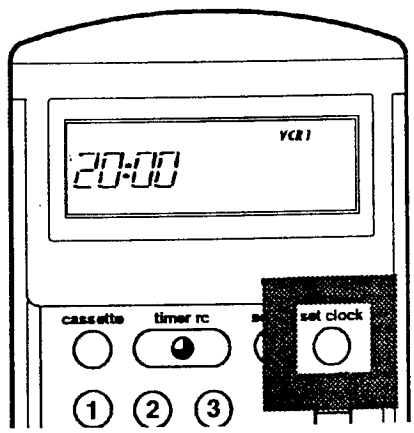
❹ Switch off the video recoder with button STANDBY if you no longer want to watch TV.

Preparing the remote control for use

How do I set the clock on the remote control?

Should the clock not be correctly adjusted (after having changed the batteries, for example), the data will flash on the remote control display.

❶ Press button SET CLOCK on the remote control.



The word 'CLOCK' will flash in the remote control display.

❷ Now set the precise time by pressing button ⊞ or ⊟ or use the digit buttons 0-9. The clock will start again only after step ❸ has been completed.
If you do not wish to change the data displayed, press button STANDBY ⏻ on the remote control.

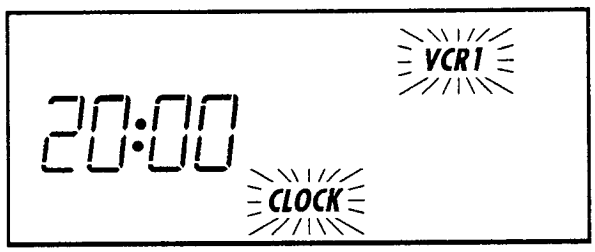
❸ Then press SET CLOCK again.

VCR 1 / VCR 2 switch-over

This is an important function for you if you have two video recorders which accept the same remote control code. You can quite easily change the remote control code for this video recorder and this remote control, so as to prevent the unintentional operation of the wrong video recorder.

1. Switch off the video recorder with button STANDBY. Now press button INSTALL on the video recorder. The display of the video recorder will show the indicator for the 'TEST PICTURE'.
2. Press SET CLOCK on the remote control (buttons TODAY and CASSETTE together).

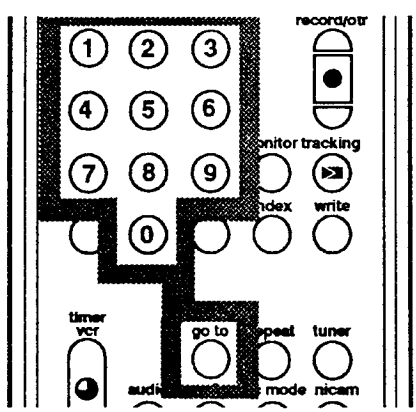
   The remote control display will show, e.g.:



3. Press button SELECT (remote control) **for more than five seconds** until 'VCR 2' appears in the display.
4. Press SET CLOCK on the remote control.
5. Press button STANDBY on the remote control. The video recorder is now switched over.
6. If you want to switch the set back to 'VCR 1', simply follow the same sequence.
   The remote control again shows 'VCR 1'.

Search for tape position (GO TO):

1. Press button GO TO on the remote control.



2. Now use the digit buttons 0-9 to enter the (4-digit) tape position that you wish to find.
3. You may now select the function to be started from that position, e.g.: STOP, ▶ or RECORD / OTR. The video recorder winds the tape to the chosen position and then continues automatically with the selected function.

For sets with TXT

1. Press the menu button INFO on the remote control.
2. Use the red or blue button to select the line 'GO TO' in the menu. Confirm this setting with the green button.
3. Now use the digit buttons 0-9 to enter the (4-digit) tape position that you wish to find.
4. You can now use the coloured buttons to enter the function (Playback, Stop, Recording) to be started from that position. The video recorder winds the tape to the chosen position and then continues automatically with the selected function.

The VHS Index Search System ('VISS'):

The video recorder writes VISS code marks on the tape every time the record button is pressed. Using the button INDEX you can search for these VISS code marks on the tape.

You cannot use the VISS function with recordings made on another videorecorder that does not have the VISS function.

Intro-Scan:

This VISS function will give you a survey of all the TV programmes recorded on the tape.

1. Press button INDEX. The display will show 'INDEX -'.
2. Press button ▶. The tape will play for 10 seconds, then wind on to the next VISS code mark and play for another 10 seconds, and so on.

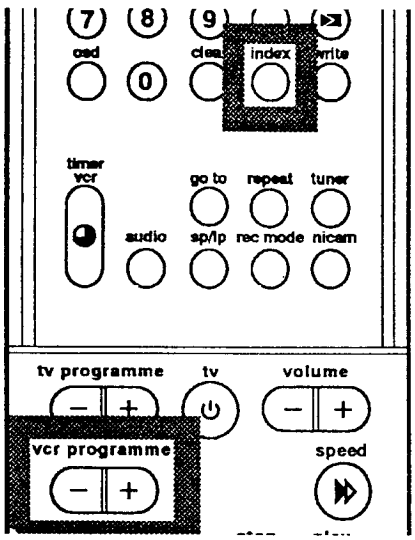
When the end of the tape is reached, the tape is rewound to the beginning.

Note: When you press any tape transport button (e.g. button ▶ or STOP), the video recorder interrupts the 'Intro-scan' function.

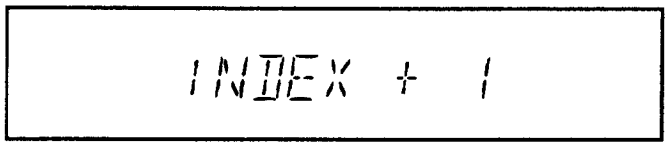
VISS search:

Select this function if you are looking for a particular VISS code mark.

1. First press button INDEX (remote control), and then button + to select the following code mark, or button − to select the previous one.
   If you are looking for a code mark that is not the next one, press button + or − as often as is necessary.



The display of the video recorder will show, e.g.:



❷ Select the function that is to follow after the code mark is found (e.g: 'playback').
When the code mark is found, the video recorder then begins with the function you chose.

Note : When you press any tape transport button (e.g. button ▶ or STOP ■), the video recorder interrupts the search.

Setting or erasing VISS code marks manually:

To find certain positions on the tape quickly, you can set and erase code marks by yourself.
This only works with cassettes which are not protected against recording.

If you want to **set** a code mark, proceed as follows:

❶ During playback, search for the position on the tape to be marked.

❷ At the right position, press button WRITE . A code mark will be set.

If you want to **erase** a code mark, proceed as follows:

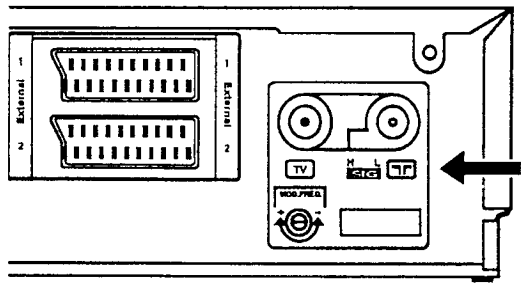
❶ Press button INDEX . Use button + or − to select the code mark that you want to erase.

❷ Then press button CLEAR immediately. The video recorder will now search for the code mark. When it is found, the video recorder switches to the 'STILL' position. 'CLEAR INDEX' will then flash in the display.

❸ Press button CLEAR again. The video recorder returns to playback, erases the code mark and remains in the 'STOP' position.

Attenuator switch - SIG

Normally, you can leave the attenuator switch at the rear of the video recorder at position L . Set to position H only when interference (poor picture quality) occurs in an area with a strong signal.



Child lock

This function prevents the unauthorized operation of your video recorder. All button functions are blocked. If a button is pressed, 'LOCKED' appears for a few seconds in the display. But don't worry: Programmed recordings are made despite the child lock and cannot be interrupted.

❶ Press button STANDBY on the remote control **for more than five seconds** until 'LOCKED' appears in the display. The child lock is now activated.
Keep the remote control in a safe place.

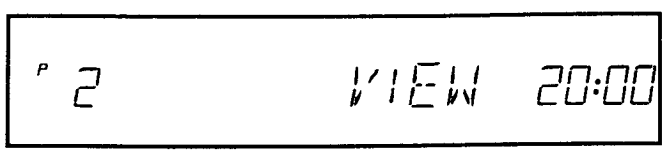
❷ When you want to switch off the child lock, press button STANDBY again **for more than five seconds**.
After five seconds 'UNLOCKED' appears in the display.

View mode

You can make use of extra functions with an appliance connected to socket EXTERNAL 2 . This appliance could be another video recorder, a decoder, a satellite receiver, or a video-CD player.

When the video recorder is switched off, the AV-Eurocon-nection from the second appliance to the TV set is still connected.

If your second appliance transmits a control signal, for example, during playback, this video recorder recognises this and automatically switches over to 'View Mode'. You can switch the 'View Mode' on and off with button MONITOR .



Note: If you have selected an external AV-Eurosocket for the programme number ('E1' or 'E2'), the video recorder cannot switch over to 'View Mode'.

The TV monitor function

You can press button MONITOR to switch the TV set to programme number 'AV' (= **A**udio/**V**ideo input). The video recorder must be switched on.
The display shows 'VCR MONITOR' for a few seconds. Press the button again to switch the monitor function off.

An important note: The monitor function responds **only** if the TV set is also equipped for this switch-over and you use an AV-Euro-cable for the connection to the TV set.

AV-Euro-sockets (scart-sockets)

This video recorder has two AV-Euro-sockets. You can connect a second appliance, e.g. a second video recorder, a satellite receiver or a video-CD player, to the AV-Euro-socket EXTERNAL 2. Connect the TV set to the socket EXTERNAL 1.

Connecting to Hi-Fi equipment

Use an audio cable to connect the socket AUDIO IN to the corresponding output socket on the audio amplifier. You can buy this cable from your dealer.

Connect the socket AUDIO OUT to the corresponding input socket on the audio amplifier.

An extra feature of this remote control

If you have a TV set that can accept the remote control code of this remote control, you can also use the remote control for some TV functions:

* Programme number +/-
* TV volume +/-
* Switch off TV

This remote control is equipped with a number of remote control codes pre-defined for specific TV manufacturers. You can select the TV volume or programme number, as well as switching the TV on and off.

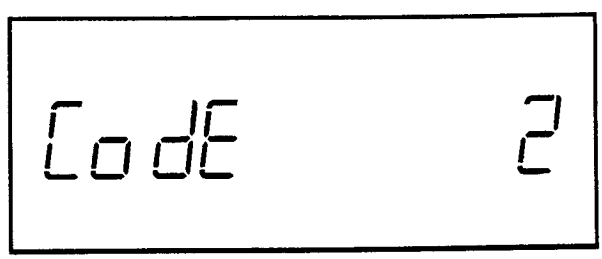
Note: If the selected code does not work on your TV set or if you can't find your TV manufacturer in the list, you can test all the codes one by one. Here is a list of some of the manufacturers.

Code number	TV set manufacturer
0	Philips,Pioneer, Hornyphon, Mediator, Aristona, Phonola, Radiola, SBR, Sierra, Erres, Pye, Dux, Schneider (F), Universum
1	Sinudyne
2	Finlux, Universum
3	Salora, Nokia, ITT, Luxor, Pioneer, Schneider, Dual
4	Orion
5	Panasonic
6	Telefunken*)
7	Telefunken,Thomson Brandt, Saba, Nordmende, Ferguson, Marconi, Continental, Edison*)
8	Sanyo
9	Grundig, Siemens

*) **Note** for code numbers '6' and '7': When you are selecting your TV channels, hold down the button TV PROGRAMME − and use the digit buttons 0-9 to select the programme number.

Enter the desired code number into the video recorder as follows:

❶ Press button TV PROGRAMME − and TV VOLUME + at the same time. The display will show, e.g.:



❷ Use the digit buttons 0-9 to select the code number.

❸ To conclude, press button STANDBY.

2. SERVICE TEST PROGRAM

2.1 Introduction

In the software program of the µC's, a service test program has been recorded. The service test program is divided into four modes of operation:

- Checking the tape deck functions / control µC mask number
- Checking the sensors in the tape deck + deck status / deck µC mask number
- Elapsed time indicator / display µC mask number
- Continous test

2.2 Calling up the Service Test Program

The service test program is called up by simultaneously pressing the 'STOP' button on the remote control and the 'PLAY' button on the equipment for at least 5 secs.

On the display there then appears, in place of the tape counter reading, information about the first mode of operation of the service test program. This can be changed to the next respective mode of service operation by pressing the 'TIMER' button on the remote control. The service test program may be called up in any operational state of the equipment, with the exception of station finding. During service mode the equipment remains fully operational in all tape deck functions. The test program is switched off by pressing the 'STAND-BY' button or by disconnecting the equipment at the mains.

2.3 Forced RAM Clear

A forced RAM clear is possible by pressing PLAY, STANDBY, EJECT buttons on the set simultaneously when the set is being connected to the mains.

Attention:

The set loses all the information stored by the customer (presets, time, year etc.)

2.4 Checking the Tape Deck Functions

2.4.1 Time Required for Threading in and Threading out

For this check, the signal (FTA) from the light barrier, which controls the turning of the threading motor, is taken as the reference.

2.4.2 Failure of the Left or Right Winding Disk

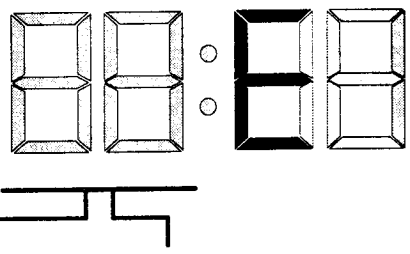
For checking this, the tacho signals from the left (WTAL) and right (WTAR) winding disks are taken as a a reference point. If one or both of the signals are absent, the equipment attempts to bring the lift mechanism into the 'eject' position and switches to 'stand-by'.

2.4.3 Failure in the Head Wheel Motor

For checking this, the PG/FG signal is used.. It is diverted from the EMK of that tape spool of the head wheel motor through which no current is flowing and indicates the position of the head wheel. If the PG/FG signal is not available, the equipment attempts to bring the lift mechanism into the 'eject' position and switches to 'stand-by'.

2.4.4 Explanation of the Error Code

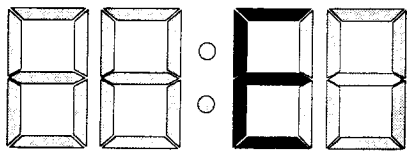
After calling up the service test programme, the data for checking the tape deck appear in four figures (--:E-) in place of the tape counter reading. The first two figures indicate the status of the tape deck in which the error has occurred (see fig. 2.1.).



00	standby	21	pause dubbing
01	eject on	24	record insert
02	stop	28	play reverse x9
03	still	29	play reverse x7
04	play	30	play reverse x5
05	tuner	31	play reverse x3
06	record	32	play x5
07	play + tracking	33	play x7
08	scan forward	34	play x9
09	scan reverse	35	fixed tracking
10	wind	36	record prepared
11	rewind	37	frame forward
12	pause	38	frame reverse
13	reverse	39	slow 1/24
14	play x3	40	slow 1/12
15	slow	41	slow 1/6
16	tuner eject	42	slow 1/2
17	stand by eject	43	slow reverse 1/24
18	record simulcast	44	slow reverse 1/12
19	record audio	45	slow reverse 1/6
20	record dubbing	46	slow reverse 1/2

fig. 2.1

The last two figures indicate the type of error (see fig. 2.2.).



E0	no error
E1	threading error
E2	capstan error
E3	not used
E4	error of left tacho reel
E5	error of right tacho reel
E6	blocked headdrum

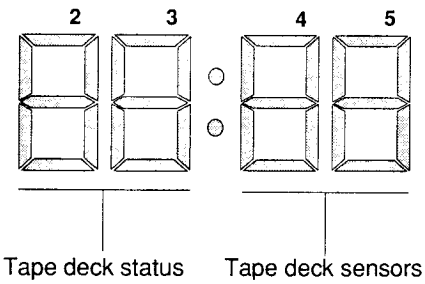
fig. 2.2.

The last error code which occurred is stored in the TIMER BACKUP RAM and remains stored even if the equipment is disconnected from the mains. This error code can be erased by pressing the 'RESET' button in the service mode.

The programme number digits show the mask number of the control μC.

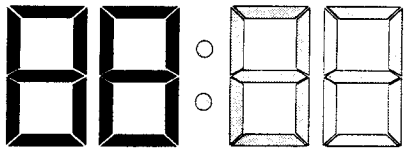
2.5 Checking the Sensors

By pressing the 'TIMER' button once, one proceeds from the tape deck check to the sensor check. The indicator is in this case 4-figured.



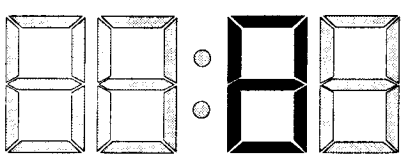
Tape deck status:

For this check, the signal (FTA) from the light barrier which controls the turning of the threading motor is taken.



Eject	0	5
	0	6
	0	7
	0	8
	0	9
Halfloading	5	L
Wind/Rewind	5	u
Indexposition	5	-
Play	u	4
	u	5
	u	6
	u	7
	u	8
Reverse	-	u
	-	-
	-	

Tape deck sensors:



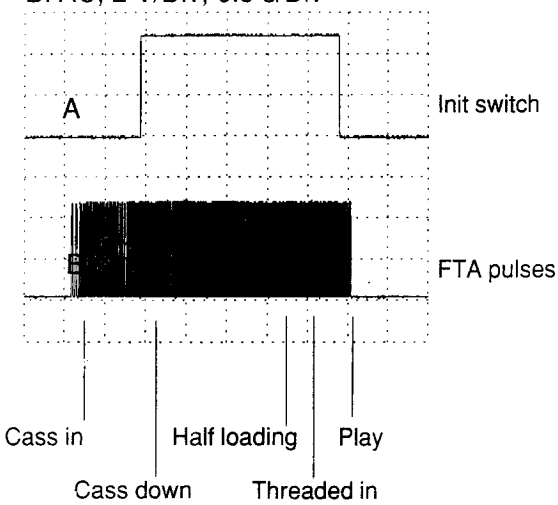
1 Pulse from right winding tachometer
2 Pulse from left winding tachometer
3 Pulse from both winding tachometers (1+2)
4 Init switch changes the display by±4

By turning the left winding tape reel the display will be changed by ±1,by turning the right winding tape reel the display will be changed by ±2.

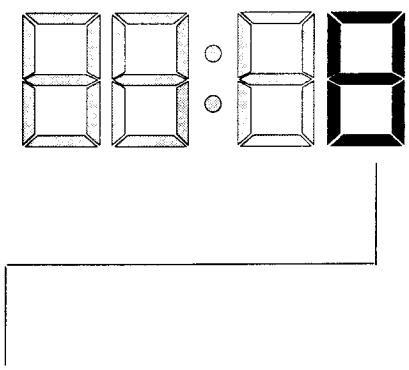
Function of the Init switch:

The diagram shows the function of the init switch depending on the position of the tape deck.

A: AC, 2 V/Div, 0.5 s/Div
B: AC, 2 V/Div, 0.5 s/Div



The amount of FTA pulses is significant for the position of the tape deck.

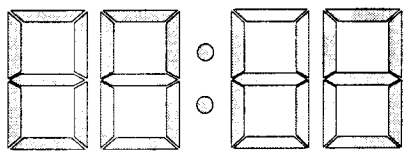


0 TAS + TAE is not acknowledged (no signal from LED)
1 TAS is acknowledged
2 TAE is acknowledged
3 TAS + TAE is acknowledged
4 RP check can only be made with the cassette

The programme number digits show the mask number of the deck µC.

2.6 Elapsed Time Indicator

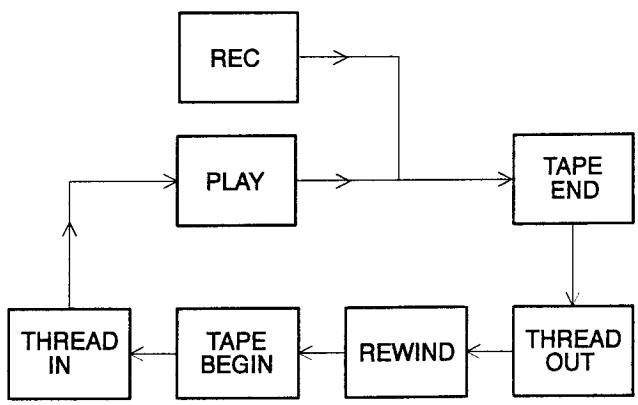
After calling up the service test programme, the elapsed time indicator can be activated by pressing the 'TIMER' button 2 times . It indicates how many hours the head disk has been rotating. This indication is four-figured.



The programme number digits show the mask number of the display µC.

2.7 Continous Test

The equipment can also be subjected to a continous test in the service programme. For this, the equipment must be switched to one of the positions 'PLAY', 'REC' or 'REWIND'. The functions are then performed continuously. This check is designed to detect intermittent errors. The last error that occurred is stored in the TIMER BACKUP RAM (the error also remains stored after a mains failure). The continous test is ended by exiting from the service test programme.



SERVICING OF SMDs (SURFACE MOUNTED DEVICES)

1. General cautions on handling and storage.

- Oxidation on the SMDs terminals results in poor soldering. Do not handle SMDs with bare hands.
- Avoid for storage places that are sensitive to oxidation such as places with sulfur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity.As a result the capacitance or resistance value of the SMDs may be affected.
- Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similarly, do not slide the circuit board across any surface.

2. Removal of SMDs

- Heat the solder (for 2-3 seconds) at each terminal of the chip. Small components can, by means of litz wire and a limited horizontal force, be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 1A) or
- While holding the SMD with a pair of tweezers take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

Caution on removal:

- When handling the soldering iron, use suitable pressure and be careful.
- When removing the chip, do not use undue force with the pair of tweezers.
- The soldering iron to be used (approx. 30 W), must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).
- The chip, once removed, must **never** be used again.

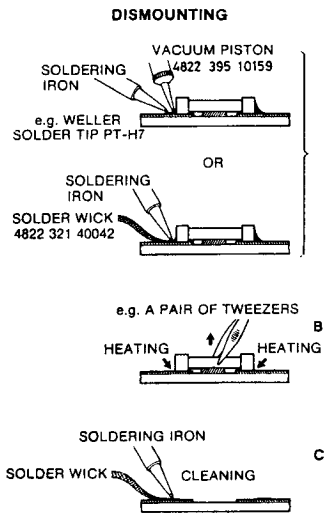


Fig. 1

3. Attachment of SMDs

- Locate the SMD on the solder lands by means of tweezers and solder the component at one side. Ensure that the component is positioned well on the solder lands (see Fig. 2A).
- Next complete the soldering of the terminals of the component (see Fig. 2B).

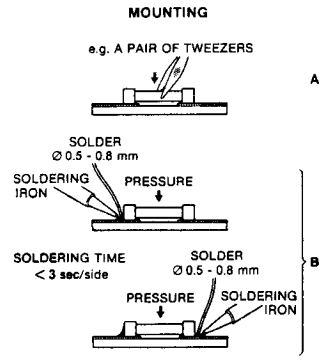


Fig. 2

Caution on attachment:

- When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible; care must be taken to avoid damage to the terminals and the body itself.
- Keep the SMD's body in contact with the printed board when soldering.
- The soldering iron to be used (approx. 30 W) must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).
- Soldering should not be done outside the solder land.
- Soldering flux (of rosin) may be used but should not be acidic.
- After soldering, let the SMD cool down gradually at room temperature.
- The quantity of solder must be proportional with the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the d board (see Fig. 3).

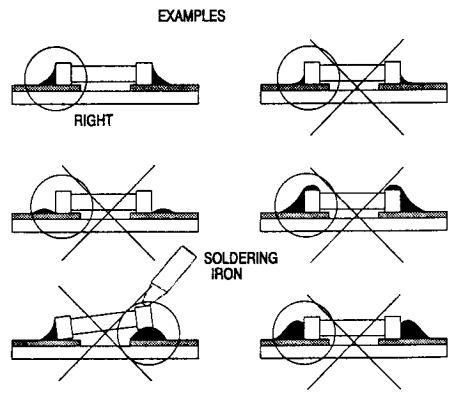


Fig. 3

REMOVAL OF CASE COMPONENTS AND SERVICE POSITIONS OF PRINTED CIRCUIT BOARDS

1. The casing cover

Dismantling:

Unscrew the screws A, B, C, D, E, F and G (see fig. 1).
Pull back the casing cover for appr. 1 cm, and when the side panels are being slightly pressed outward, the cover can be taken off.

Assembly:

Place the front groove tightly on the front panel. Then carry out the assembly in reverse order.

2. The bottom plate

Place the unit with the bottom side up.
The bottom plate can be lifted.off by releasing the six snap hooks (see fig. 2).

3. The front panel

Remove the casing cover (see point 1).
Press the two snap hooks on the left and the two snap hooks on the right at the front outward. Press the front at the top slightly forward, release the 3 snap hooks at the bottom side of the front and pull forward (see fig. 3).

Note:

For assembly, the front panel has to be slipped on in parallel to the control print. For this purpose, the lever which serves to open the lift flap has to be pushed into the flap guide.

4. Exchanging the keyset

Remove the front panel (see point 3).
Detach the keyset from the front by releasing the 6 snap hooks (see fig. 4) and slip the flexprint out

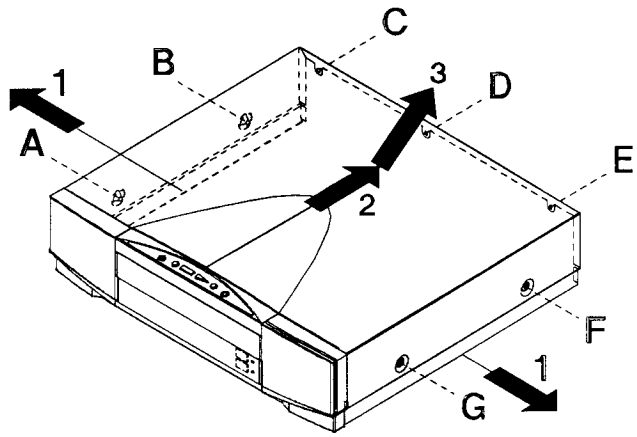


fig. 1

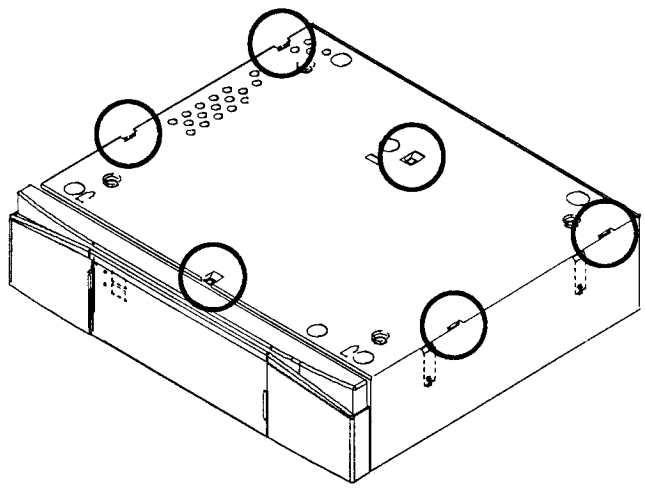


fig. 2

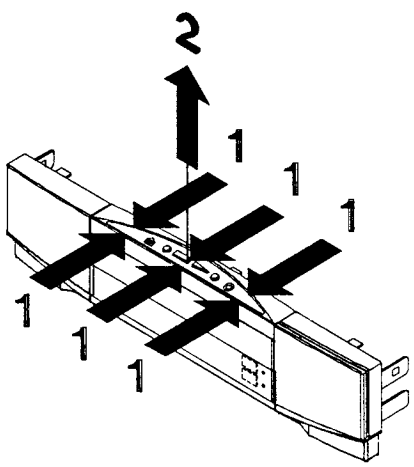


fig. 4

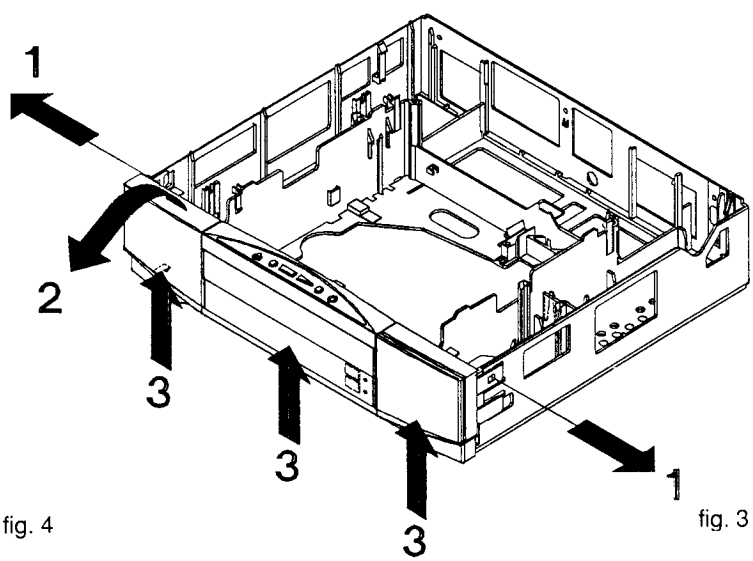


fig. 3

5. LFBU (Family board)

Unscrew the two screws H.
Release the 6 snap hooks (see fig. 5).
Now lift the LFBU, turn it into the service position (see fig. 6) and place it into the slots provided.

6. PMS (Signal electronics), LSC (Scartprint)

Disassemble the LFBU as in point 5 and place it to the front on the drive assembly (take care of the insulation) (see fig. 7).

7. LAF (FM Audio)

Remove the LFBU as in point 6.
Pull out the LAF print upward (past the LFBU), turn it by 180 (see fig. 8) and slip it onto the LFBU (see fig. 9).

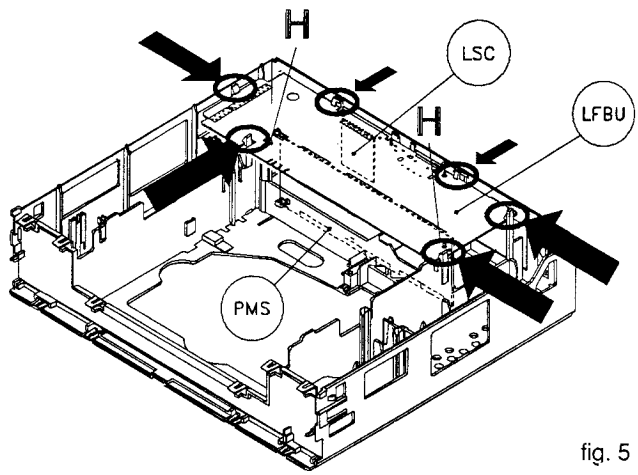


fig. 5

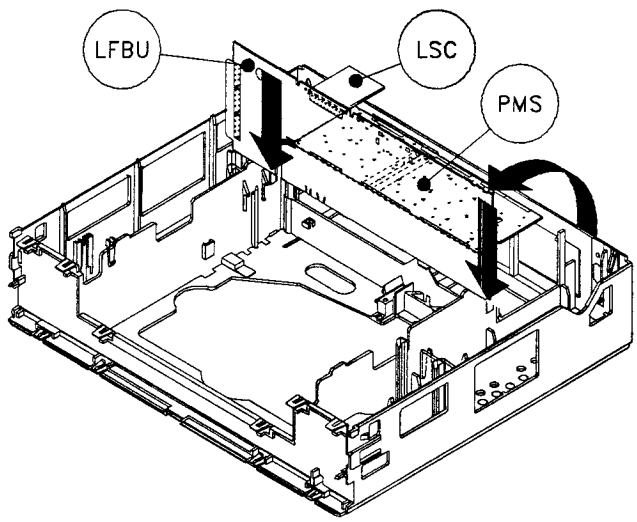


fig. 6

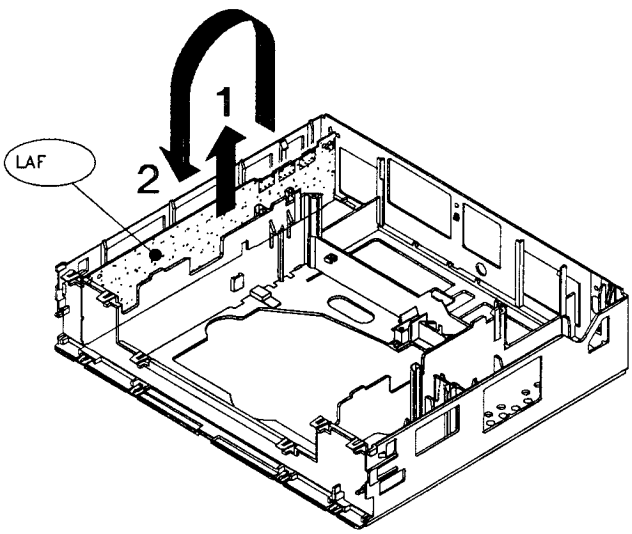


fig. 8

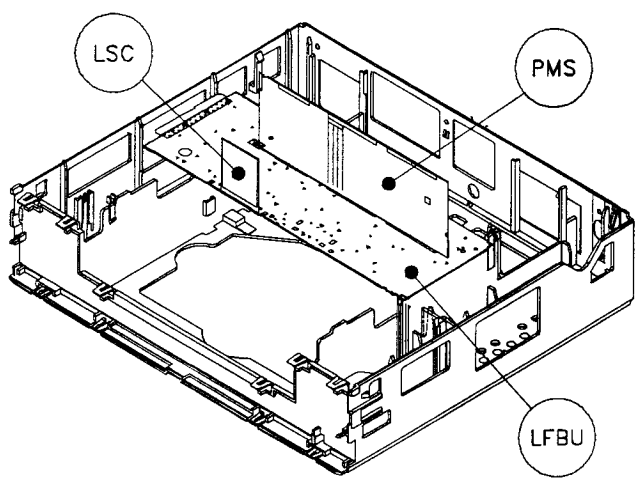


fig. 7

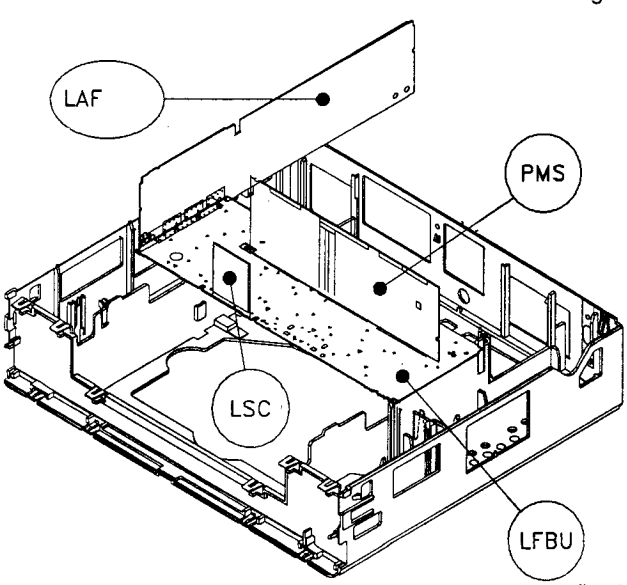


fig. 9

8. LCO (Control board)

The LCO can be pulled upward from the unit (see fig. 10).

9. LCS (Capstan switch)

The LCS can be pulled upward from the unit (see fig. 10).

10. LSM 45 (Power supply)

The LSM 45 can be removed from the unit by releasing the two snap hooks (see fig. 11).

11. LDC (Control print)

Remove the front panel see point 3.
The control print can be removed by releasing the snap hooks (see fig. 12).

12. Drive assembly

Remove the front panel see point 3.
Unscrew the 3 screws V, R, and S.
The complete drive assembly can now be removed from the frame (see fig. 13).

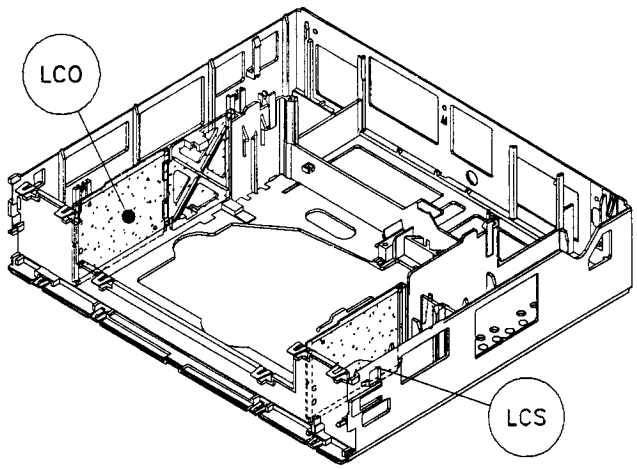


fig. 10

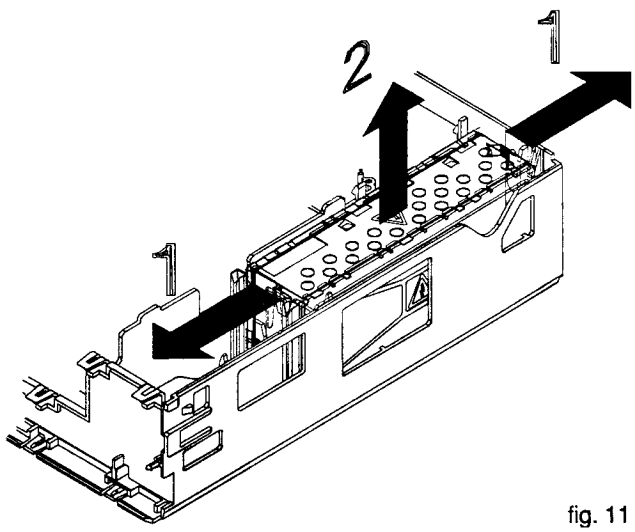


fig. 11

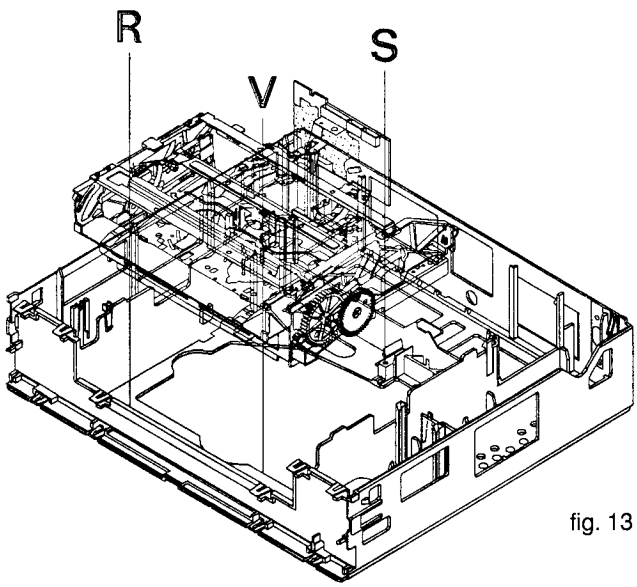


fig. 13

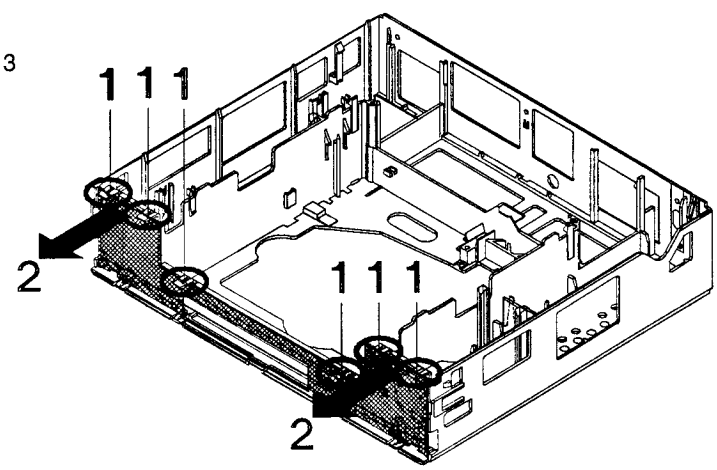
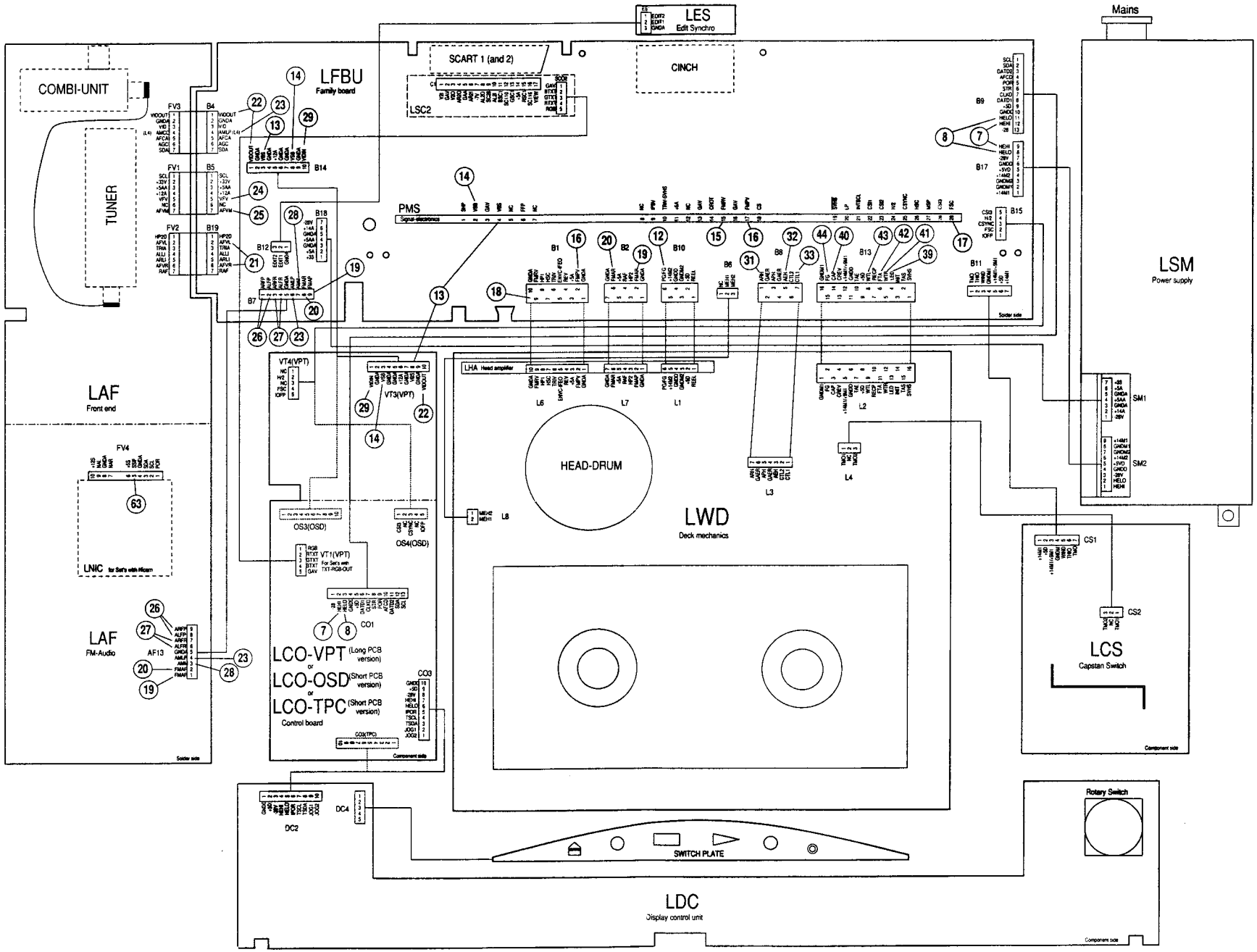


fig. 12

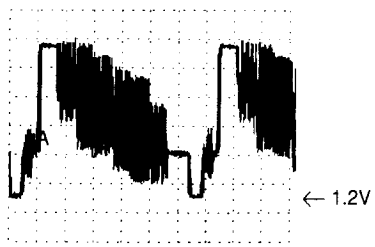
LIST OF PLUG ABBREVIATIONS

AEH	Audio erase head
AFCA	Automatic frequency control analog
AFCD	Automatic frequency control digital
AFVL	Audio left from frontend
AFVM	Audio mono from frontend
AFVR	Audio right from frontend
AGC	Automatic gain control
AH1/2	FM - audio heads
AHC	FM - audio heads common
AL2I	Scart 2 audio left input
AL2O	Scart 2 audio left output
ALFP	Audio left FM-playback
ALFR	Audio left FM-record
ALLI	Audio left level indication
AMCO	Audio to the modulator
AMLP	Audio mono linear playback
AMLR	Audio mono linear record
AMM	Audio mono mix
APH	Audio playback head
AR2I	Scart 2 audio right input
AR2O	Scart 2 audio right output
ARFP	Audio right FM-playback
ARFR	Audio right FM-record
ARH	Audio record head
ARLI	Audio right level indication
BSC1	Blue for scart 1
BTXT	Blue from TXT RGB signal
CAP	Capstan on
CLKD	Serial bus
CREV	Capstan reverse
CROT	Colour rotation
CSI1/2	Colour standard information in
CSI3 (CS)	Colour system information
CSYNC	Sync impulse
CTL1,2	Control track signal
DATD1/2	Serial bus
EDIT1/2	Edit control signal
ENVC	Envelope comparator
FFP	Feature frame pulse
FG	Position Info Capstan
FMAP	FM audio playback
FMAR	FM audio record
FMPV	FM playback video signa
FMRV	FM record video signal
FP	Full page
FPOS	Full page or OSD
FP/PAL	Full page PAL
FSC	Colour subcarrier
FTA	Threading tacho
GAA	Ground analog audio
GAER	Ground audio erase head
GAV	Ground analog video
GNDA	Ground analog
GNDD	Ground digital
GNDM1	Ground capstan motor
GNDM2	Ground head drum motor
GSC1	Green for scart 1
GTXT	Green from TXT RGB signal
HEHI, HELO	Displaytube heater HI, LO
HMO	Head drum motor
HP1 (2)	Head pulse video, (audio)
HP2D	Head pulse for FM - audio delayed
HSC (HSD)	Head select control
H/2	Half line frequency on
ICSI3	Inverse colour system information
INIT	Deck switch
INTSC	Inverse NTSC
IOFP	Invers OSD Frame Pulse
IPAL	Invers Pb Audio Linear
IPBV	Inverse playback video
IPOR	Inverse power on reset
IRAL	Inverse record audio linear
IREV	Inverse record video
JOG1/2	Jog/Rotary speed data
LED	LED tower supply
LH1/2	Video LP heads
LHC	Video LP heads common
LP	Longplay on
MEH1	Main erase head
MEH2	Main erase head,GND
MEHO	Main erase head on
MSP	Multi speed on
MTA	Mute audio
NAL	NICAM audio left
NAR	NICAM audio right
NC	Not connected
PG/FG	Scanner position/-speed
POR	Power on reset
POS	Position pulse head disc
RAF	Record audio AF
RECP	Record protect
REEL	Scanner control
REV	Record video
RGB	TXT RGB on
RSC1	Red for scart 1
RTXT	Red from TXT RGB signal
SC110	Scart 1 pin 10
SC116	Scart 1 pin 16
SC28	Scart 2 pin 8
SCL, SDA	IIC bus
SH1/2	Video heads
SHC	Video heads common
SHP	Sharpness control
SSIF	Second sound interfrequency
STR	Shift register strobe
TAE	End of tape detection
TAS	Beginning of tape detection
'HIO	Threading in/out signal
'MO 1,2	Threading motor
'RIA	Tracking information audio
'RIV	Tracking information video
'SCL,TSDA	Toshiba bus
'XPBV	TXT playback video
'2I	Scart 2 video input
'2O	Scart 2 video output
'BS	Video to SE
'FV	Video of frontend
'H+	Supply Hall Sensor Head Motor
VH-	Ground Hall Sensor Head Motor
VID	Video identification
VIDIN	Video in
VIDOUT	Video out
VMUTE	Video sync mute
VSB	Video from SE
WIND	Wind/Rewind signal
WTL	Wind tacho left
WTR	Wind tacho right
+12A	+12V analog supply
+12S	+12S analog supply after fuse
+14A	+14V analog
+14M1	+14V for capstan and threading motor
+14M1/+9M1	Switched capstan motor supply
+14M2	+14V for head drum motor
+33V	+33V Tuning supply
+5A (5VA)	+5V analog for I/O, SE and LHA
+5AA	+5V for frontend and FM - audio
+5D	+5V digital after fuse
+5S	+5V analog after fuse
+5VD	+5V digital
-28V	-28V for display
-7V	-7V for In/Out

WIRING DIAGRAM

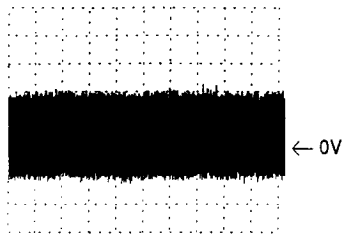


A: AC, 0.2 V/Div, 10 us/Div



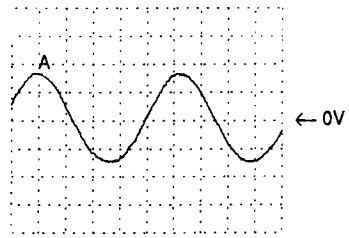
Osc 13
Connector 4/LSE, 3B14 VBS

A: DC, 0.2 V/Div, 5 ms/Div



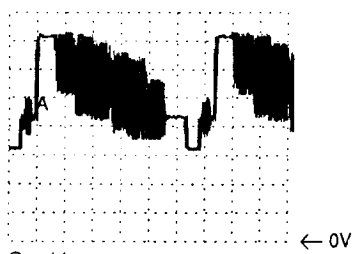
Osc 20
2AF13 FMAR

A: DC, 0.5 V/Div, 0.2 ms/Div



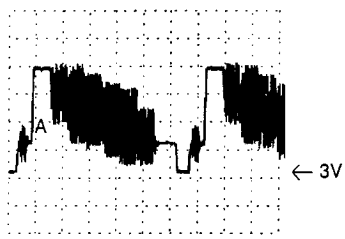
Osc 27
6/7 AF13 ALFR/ARFR

A: DC, 0.5 V/Div, 10 us/Div



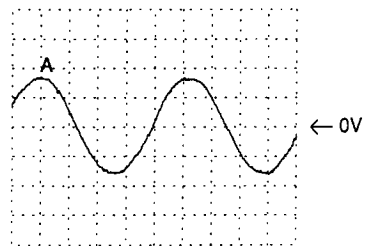
Osc 14
Connector 2/LSE, 8B14 VSB

A: AC, 0.5 V/Div, 10 us/Div



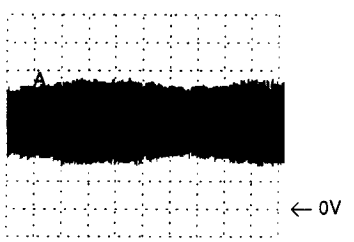
Osc 22
1B4, 1B14 VIDOUT

A: DC, 0.5 V/Div, 0.2 ms/Div



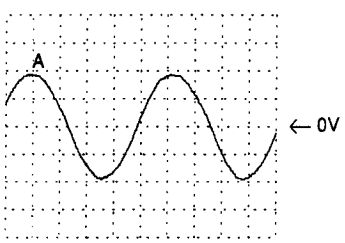
Osc 28
3AF13 AMM

A: DC, 0.2 V/Div, 10 us/Div



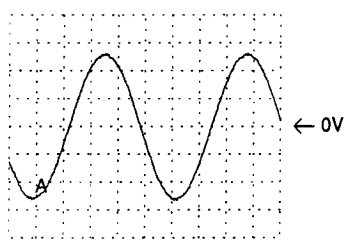
Osc 15
Connector 15/LSE FMRV

A: DC, 0.5 V/Div, 0.2 ms/Div



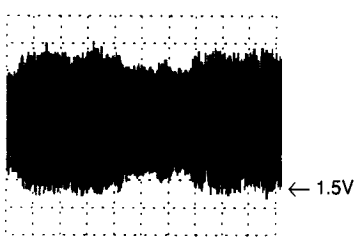
Osc 23
4AF13 AMLP

A: DC, 0.2 V/Div, 0.2 ms/Div



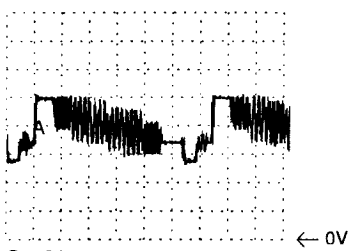
Osc 30
3/7505 AMLR

A: AC, 50 mV/Div, 10 us/Div



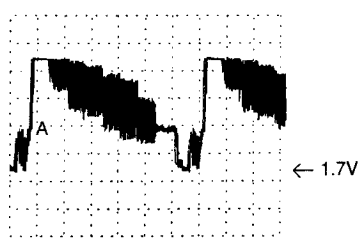
Osc 16
Connector 17/LSE, 2B1 FMPV

A: DC, 0.5 V/Div, 10 us/Div



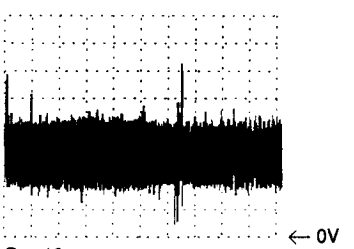
Osc 24
5B5 VFV

A: AC, 0.2 V/Div, 10 us/Div



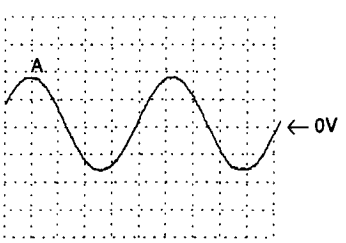
Osc 61
1/1760 VMCO

A: DC, 0.1 V/Div, 10 us/Div



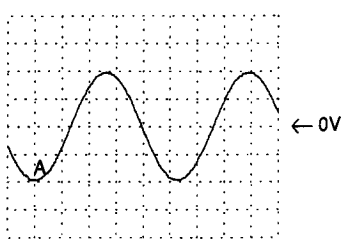
Osc 18
9B1 FMRV

A: DC, 0.5 V/Div, 0.2 ms/Div



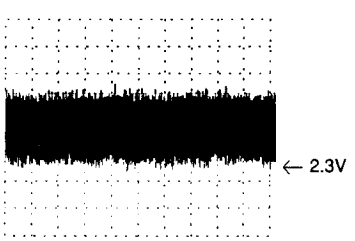
Osc 25
7B5 AFVM

A: DC, 0.5 V/Div, 0.2 ms/Div



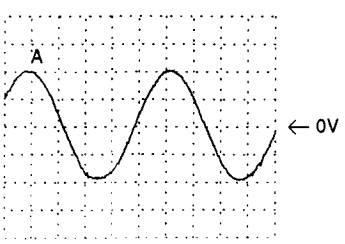
Osc 62
3/1760 AMCO

A: AC, 0.2 V/Div, 5 ms/Div



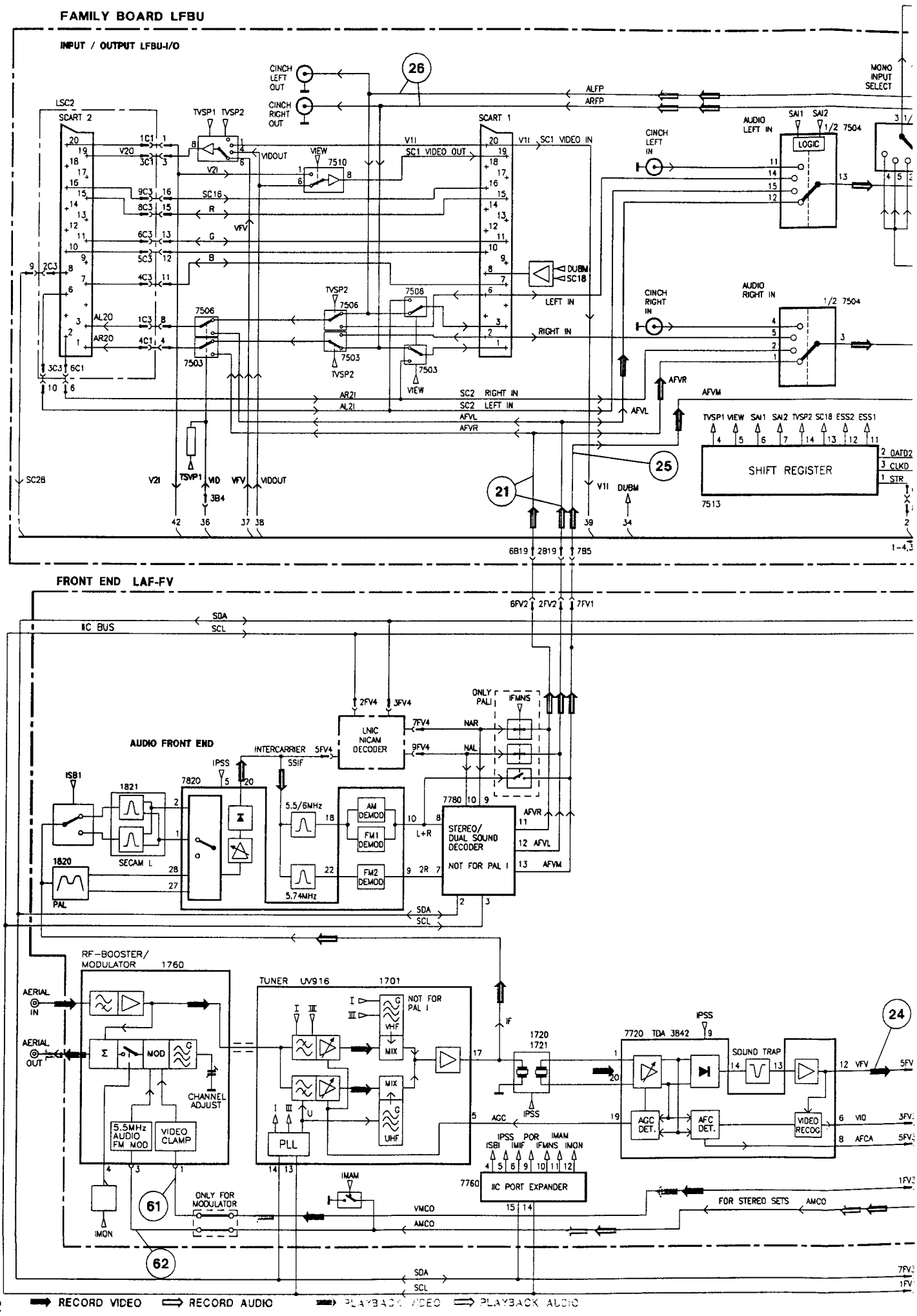
Osc 19
1AF13 FMAP

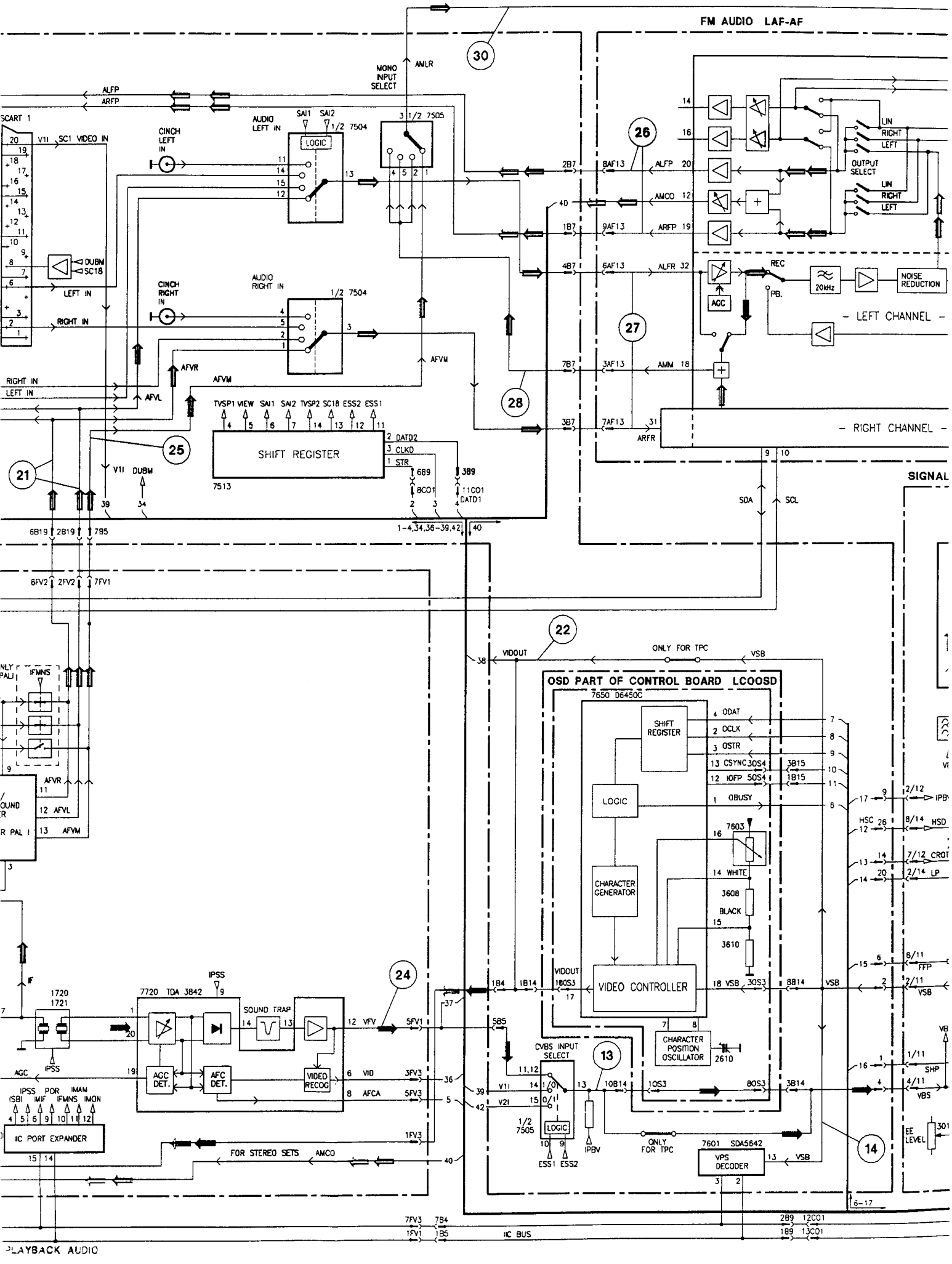
A: DC, 0.5 V/Div, 0.2 ms/Div

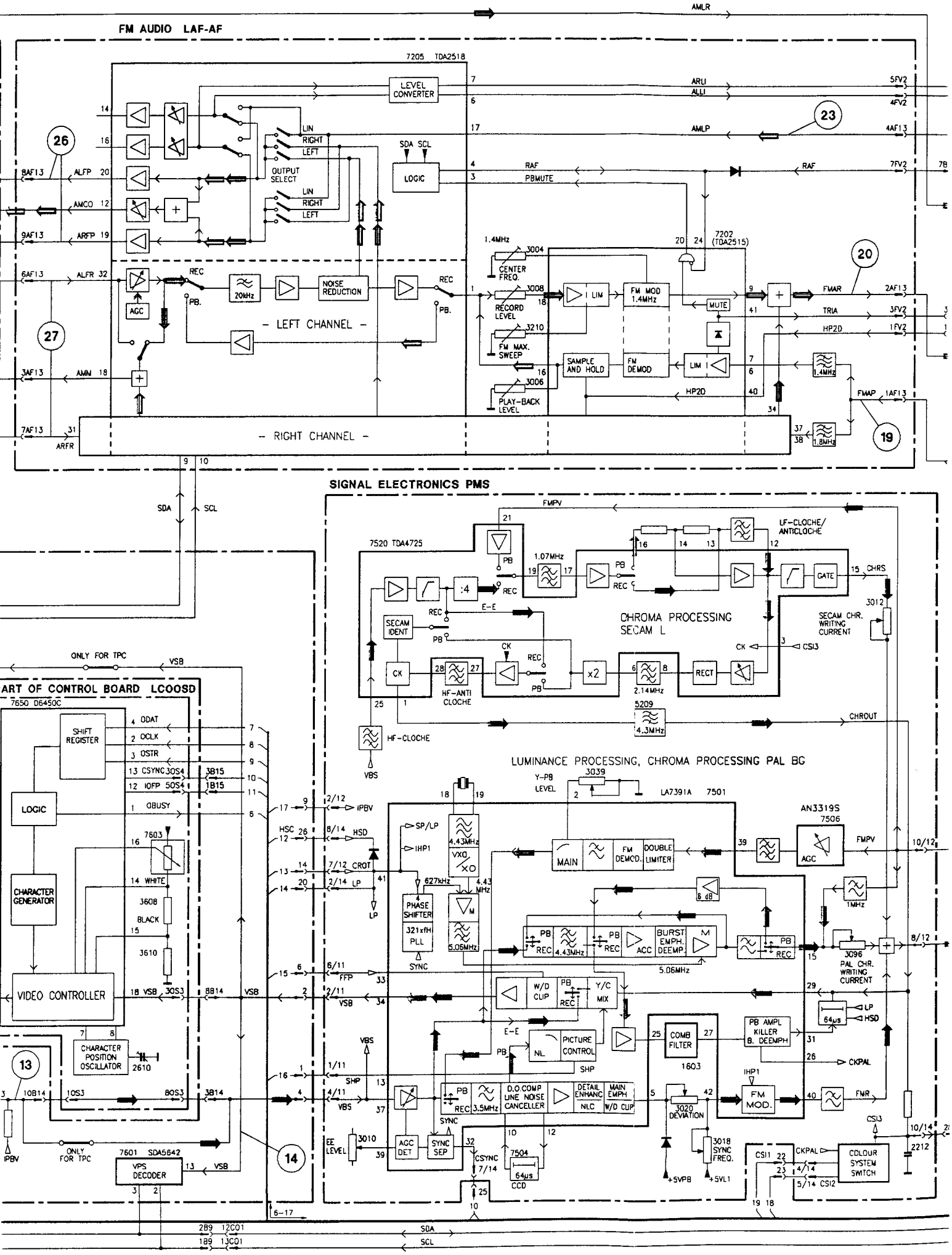


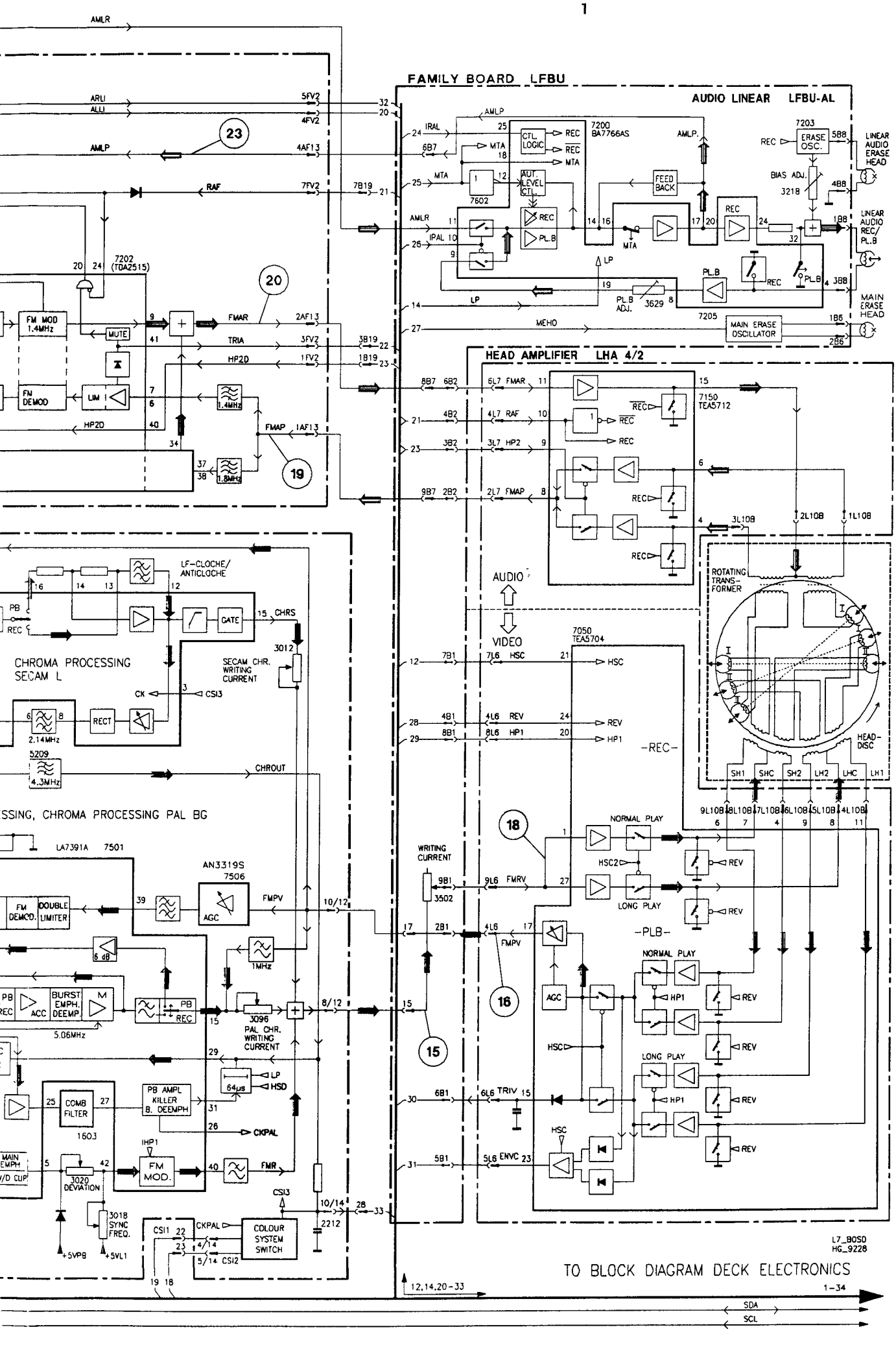
Osc 26
8/9 AF13 ALFP/ARFP

BLOCK DIAGRAM SIGNAL ELECTRONICS FOR OSD AND TPC

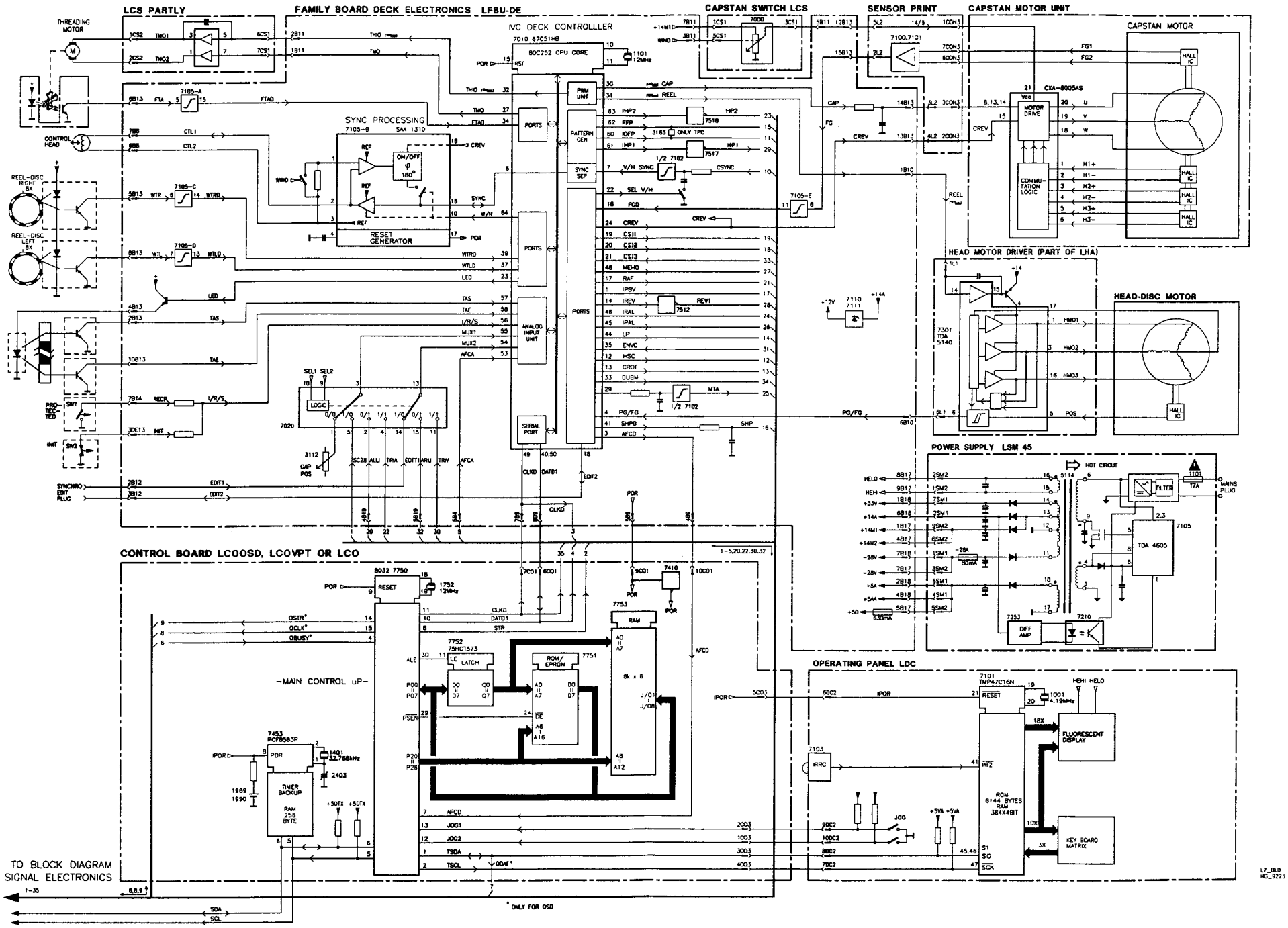



FM AUDIO LAF-AF
SCART 1
V1I SC1 VIDEO IN
CINCH LEFT IN
AUDIO LEFT IN
SAI1 SAI2
LOGIC
1/2 7504
3 1/2 7505
MONO INPUT SELECT
AMLR
ALFP
ARFP
LEFT IN
DUBM SC1B
RIGHT IN
CINCH RIGHT IN
AUDIO RIGHT IN
1/2 7504
AFVR
AFVM
AFVL
TVSP1 VIEW SAI1 SAI2 TVSP2 SC1B ESS2 ESS1
SHIFT REGISTER
7513
DATD2
CLKD
STR
DATD1
SDA
SCL
SIGNAL
LIN RIGHT LEFT
OUTPUT SELECT
REC
PB.
AGC
20kHz
NOISE REDUCTION
- LEFT CHANNEL -
- RIGHT CHANNEL -
ALFR
AMN
ARFR
6B19 2B19 7B5
6FV2 2FV2 7FV1
1-4,34,36-39,42
IFMNS
AFVR
AFVL
AFVM
OSD PART OF CONTROL BOARD LCOOSD
7650 D6450C
SHIFT REGISTER
LOGIC
CHARACTER GENERATOR
VIDEO CONTROLLER
CHARACTER POSITION OSCILLATOR
2610
ODAT
OCLK
OSTR
CSYNC
IOFP
OBUSY
7603
WHITE
BLACK
3608
3610
VIDOUT
VSB
ONLY FOR TPC
CVBS INPUT SELECT
ESS1 ESS2
IPBV
7601 SDA5642
VPS DECODER
1720
1721
7720 TDA 3842
SOUND TRAP
AGC DET.
AFC DET.
VIDEO RECOG
IPSS
VFV
VID
AFCA
IIC PORT EXPANDER
FOR STEREO SETS
AMCO
IIC BUS
PLAYBACK AUDIO
HSC
HSD
CROT
LP
IPBV
FFP
VSB
SHP
VBS
EE LEVEL
6-17

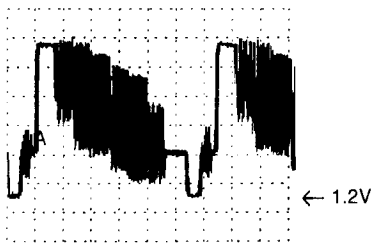

FM AUDIO LAF-AF
SIGNAL ELECTRONICS PMS
7205 TDA2518
LEVEL CONVERTER
LOGIC
OUTPUT SELECT
LIN
RIGHT
LEFT
SDA SCL
AMLR
ARLI
ALLI
AMLP
RAF
PBMUTE
7202 (TDA2515)
CENTER FREQ.
RECORD LEVEL
FM MAX. SWEEP
PLAY-BACK LEVEL
NOISE REDUCTION
20kHz
AGC
REC
PB.
- LEFT CHANNEL -
- RIGHT CHANNEL -
SAMPLE AND HOLD
FM DEMOD
FM MOD 1.4MHz
LIM
MUTE
HP2D
FMAR
TRIA
FMAP
ALFP
AMCO
ARFP
ALFR
AMN
ARFR
7520 TDA4725
CHROMA PROCESSING SECAM L
SECAM IDENT
HF-ANTI CLOCHE
HF-CLOCHE
LF-CLOCHE/ ANTICLOCHE
GATE
CHRS
CHROUT
SECAM CHR. WRITING CURRENT
LUMINANCE PROCESSING, CHROMA PROCESSING PAL BG
LA7391A 7501
AN3319S 7506
MAIN
FM DEMOD.
DOUBLE LIMITER
AGC
FMPV
PHASE SHIFTER
321xfH PLL
SP/LP
IHP1
627kHz
4.43MHz
5.06MHz
BURST EMPH. DEEMP
ACC
W/D CLIP
Y/C MIX
PICTURE CONTROL
NL
COMB FILTER
1603
PB AMPL KILLER B. DEEMPH
D.C.COMP LINE NOISE CANCELLER
DETAIL ENHANC
MAIN EMPH
NLC
W/D CLIP
FM MOD.
3020 DEVIATION
3018 SYNC FREQ.
+5VPB
+5VL1
AGC DET
SYNC SEP
CSYNC 7/14
7504
64µs
CCD
EE LEVEL
3010
PAL CHR. WRITING CURRENT
3096
3012
CKPAL
CSI1
CSI2
CSI3
COLOUR SYSTEM SWITCH
2212
ONLY FOR TPC
VSB
ART OF CONTROL BOARD LCOOSD
7650 D6450C
SHIFT REGISTER
LOGIC
CHARACTER GENERATOR
VIDEO CONTROLLER
CHARACTER POSITION OSCILLATOR
2610
VPS DECODER
7601 SDA5642
ODAT
OCLK
OSTR
CSYNC 3OS4
IOFP 5OS4
OBUSY
WHITE
BLACK
3608
3610
7603
3815
1815
IPBV
HSD
CROT
LP
FFP
VSB
SHP
VBS
SDA
SCL
12C01
13C01
6-17


1
FAMILY BOARD LFBU
AUDIO LINEAR LFBU-AL
HEAD AMPLIFIER LHA 4/2
AMLR
ARLI
ALLI
AMLP
RAF
5FV2
4FV2
4AF13
7FV2
7202 (TDA2515)
FM MOD 1.4MHz
MUTE
FMAR
2AF13
TRIA
3FV2
HP2D
1FV2
FM DEMOD
LIM
1.4MHz
FMAP
1AF13
1.8MHz
7200 BA7766AS
CTL. LOGIC
REC
MTA
AUT. LEVEL CTL.
7602
FEED BACK
IRAL
IPAL
LP
PL.B
PL.B ADJ.
3629
MEHO
7205
MAIN ERASE OSCILLATOR
7203
ERASE OSC.
BIAS ADJ.
3218
LINEAR AUDIO ERASE HEAD
LINEAR AUDIO REC/PL.B
MAIN ERASE HEAD
7150 TEA5712
6L7 FMAR
4L7 RAF
3L7 HP2
2L7 FMAP
3L10B
2L10B
1L10B
ROTATING TRANS-FORMER
HEAD-DISC
SH1
SHC
SH2
LH2
LHC
LH1
AUDIO
VIDEO
7050 TEA5704
HSC
REV
HP1
-REC-
-PLB-
NORMAL PLAY
LONG PLAY
WRITING CURRENT
3502
FMPV
AGC
HSC2
TRIV
ENVC
LF-CLOCHE/ ANTICLOCHE
CHROMA PROCESSING SECAM L
GATE
CHRS
SECAM CHR. WRITING CURRENT
3012
CK
CSI3
RECT
2.14MHz
5209
4.3MHz
CHROUT
SSING, CHROMA PROCESSING PAL BG
LA7391A 7501
AN3319S 7506
FM DEMOD.
DOUBLE LIMITER
6 dB
1MHz
BURST EMPH. DEEMP.
ACC
5.06MHz
PB REC
3096 PAL CHR. WRITING CURRENT
64µs
LP
HSD
COMB FILTER
1603
PB AMPL KILLER B. DEEMPH
CKPAL
IHP1
FM MOD.
FMR
3020 DEVIATION
3018 SYNC FREQ.
+5VPB
+5VL1
CSI1
CSI2
4/14
5/14
COLOUR SYSTEM SWITCH
2212
L7_80SD
HG_9228
TO BLOCK DIAGRAM DECK ELECTRONICS
12,14,20-33
1-34
SDA
SCL

BLOCK DIAGRAM DECK ELECTRONICS

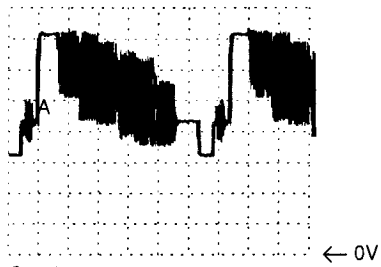


A: AC, 0.2 V/Div, 10 us/Div



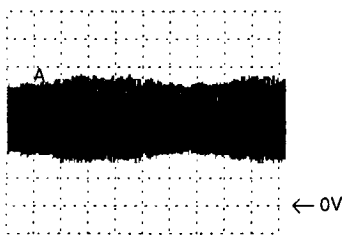
Osc 13
Connector 4/LSE, 3B14 VBS

A: DC, 0.5 V/Div, 10 us/Div



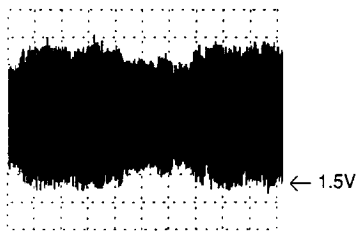
Osc 14
Connector 2/LSE, 8B14 VSB

A: DC, 0.2 V/Div, 10 us/Div



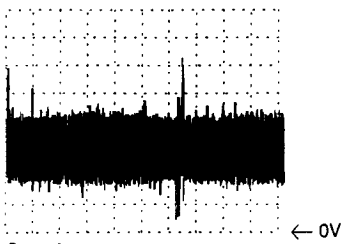
Osc 15
Connector 15/LSE FMRV

A: AC, 50 mV/Div, 10 us/Div



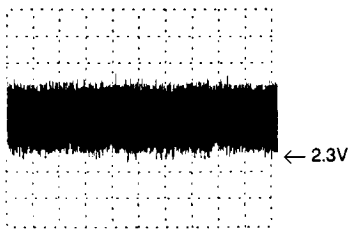
Osc 16
Connector 17/LSE, 2B1 FMPV

A: DC, 0.1 V/Div, 10 us/Div



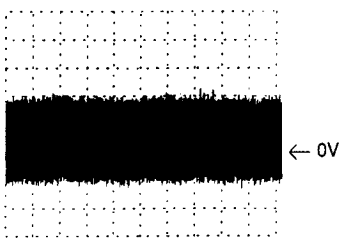
Osc 18
9B1 FMRV

A: AC, 0.2 V/Div, 5 ms/Div



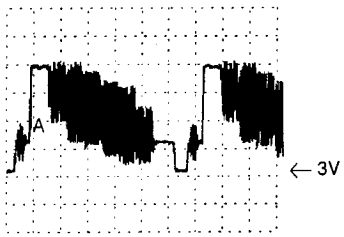
Osc 19
1AF13 FMAP

A: DC, 0.2 V/Div, 5 ms/Div



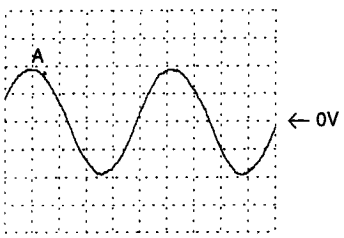
Osc 20
2AF13 FMAR

A: AC, 0.5 V/Div, 10 us/Div



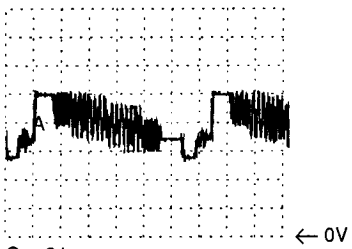
Osc 22
1B4, 1B14 VIDOUT

A: DC, 0.5 V/Div, 0.2 ms/Div



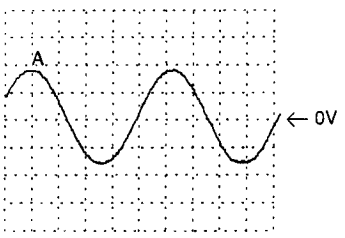
Osc 23
4AF13 AMLP

A: DC, 0.5 V/Div, 10 us/Div



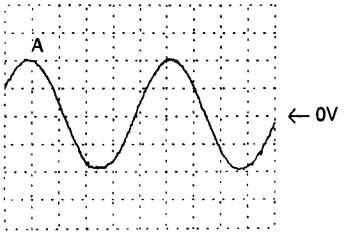
Osc 24
5B5 VFV

A: DC, 0.5 V/Div, 0.2 ms/Div



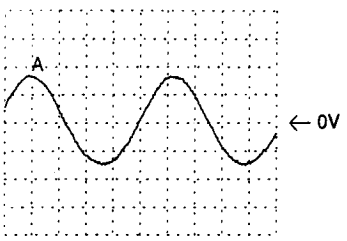
Osc 25
7B5 AFVM

A: DC, 0.5 V/Div, 0.2 ms/Div



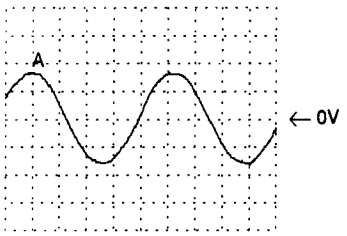
Osc 26
8/9 AF13 ALFP/ARFP

A: DC, 0.5 V/Div, 0.2 ms/Div



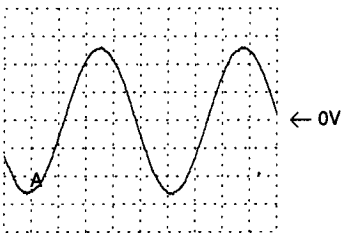
Osc 27
6/7 AF13 ALFR/ARFR

A: DC, 0.5 V/Div, 0.2 ms/Div



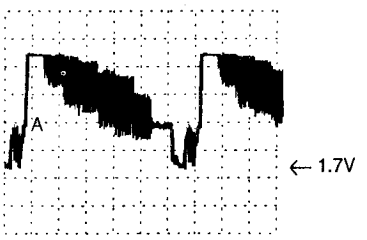
Osc 28
3AF13 AMM

A: DC, 0.2 V/Div, 0.2 ms/Div



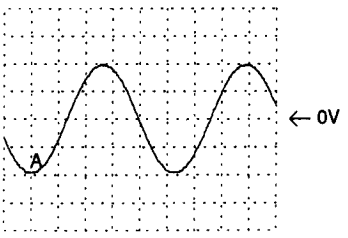
Osc 30
3/7505 AMLR

A: AC, 0.2 V/Div, 10 us/Div



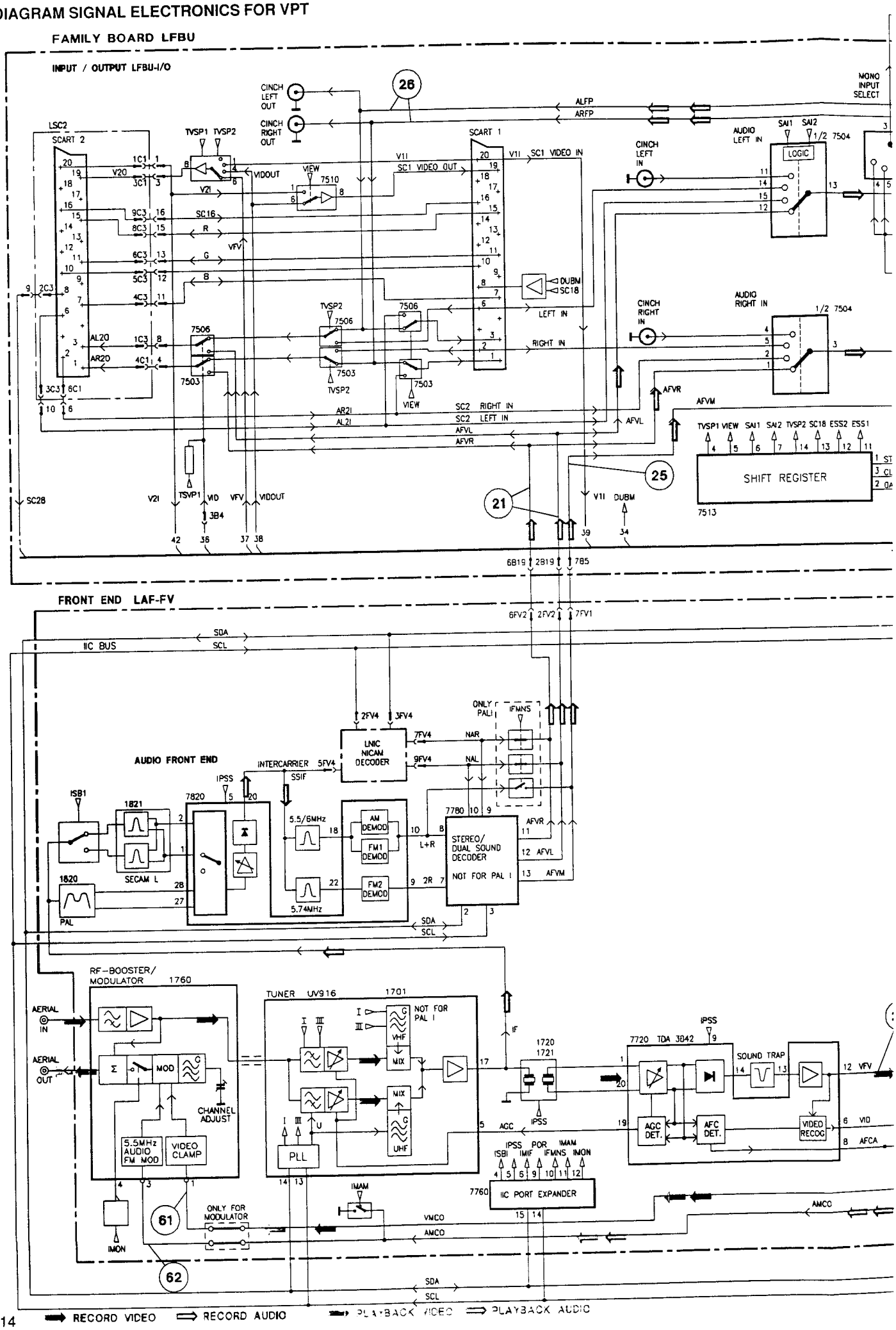
Osc 61
1/1760 VMCO

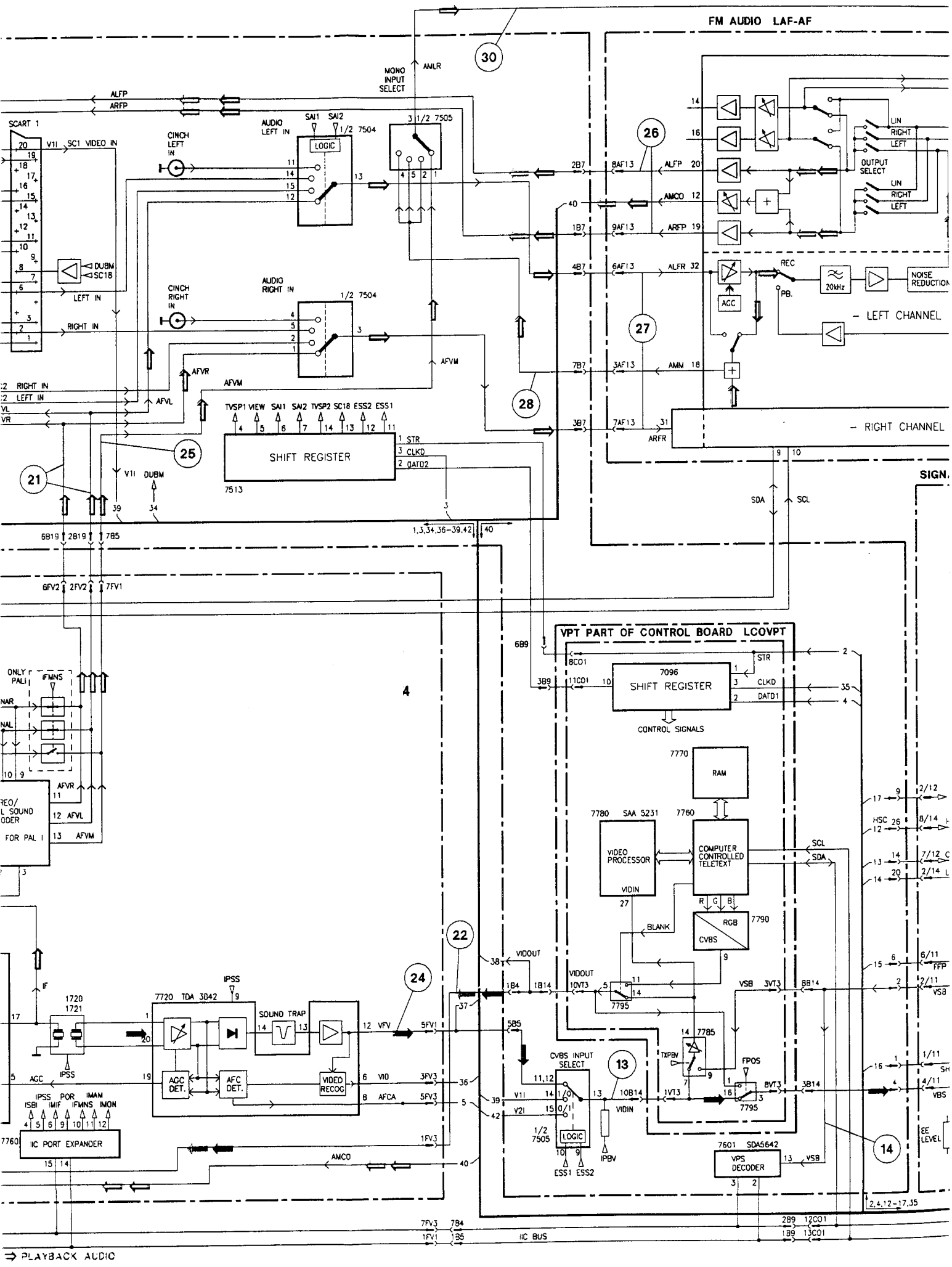
A: DC, 0.5 V/Div, 0.2 ms/Div

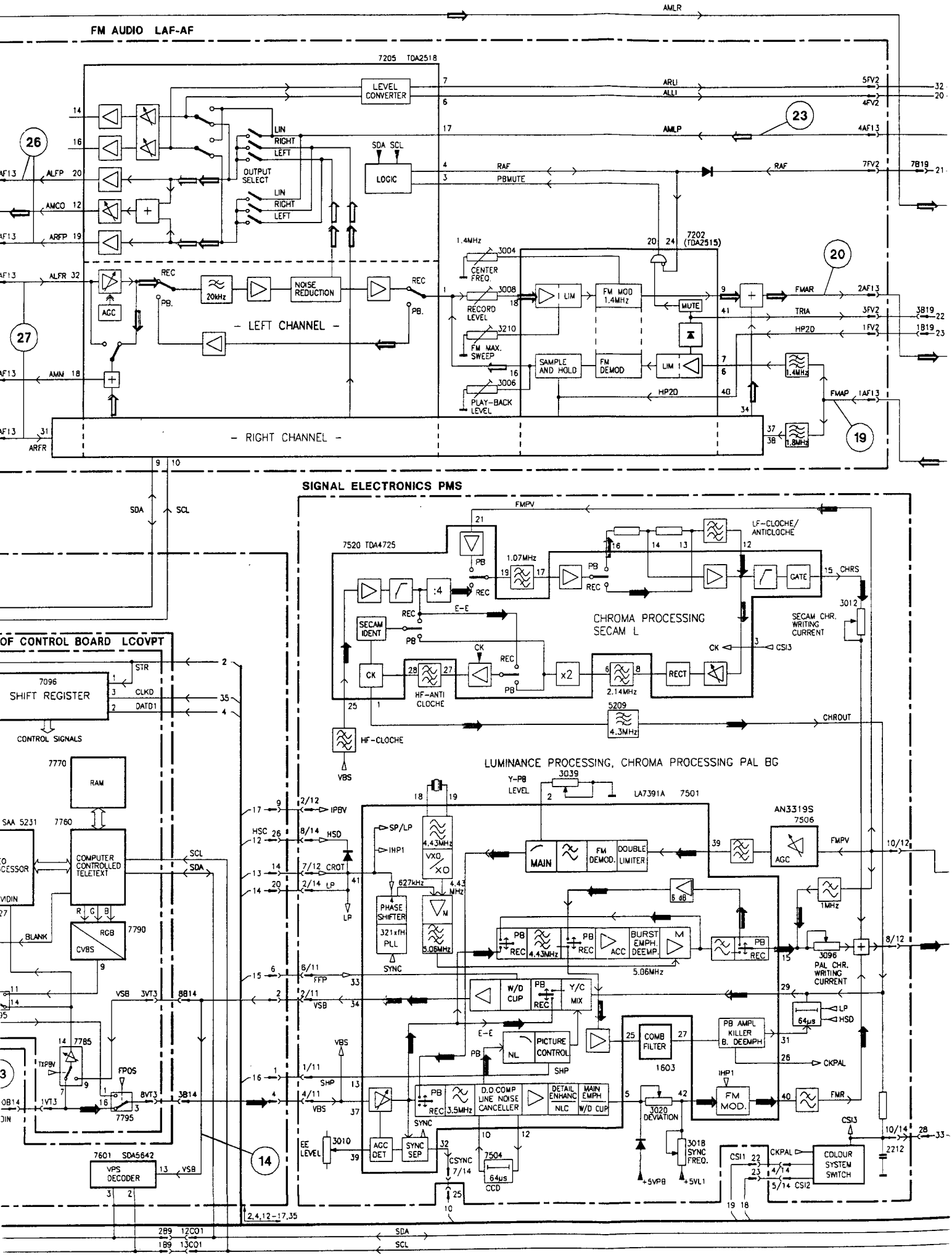


Osc 62
3/1760 AMCO

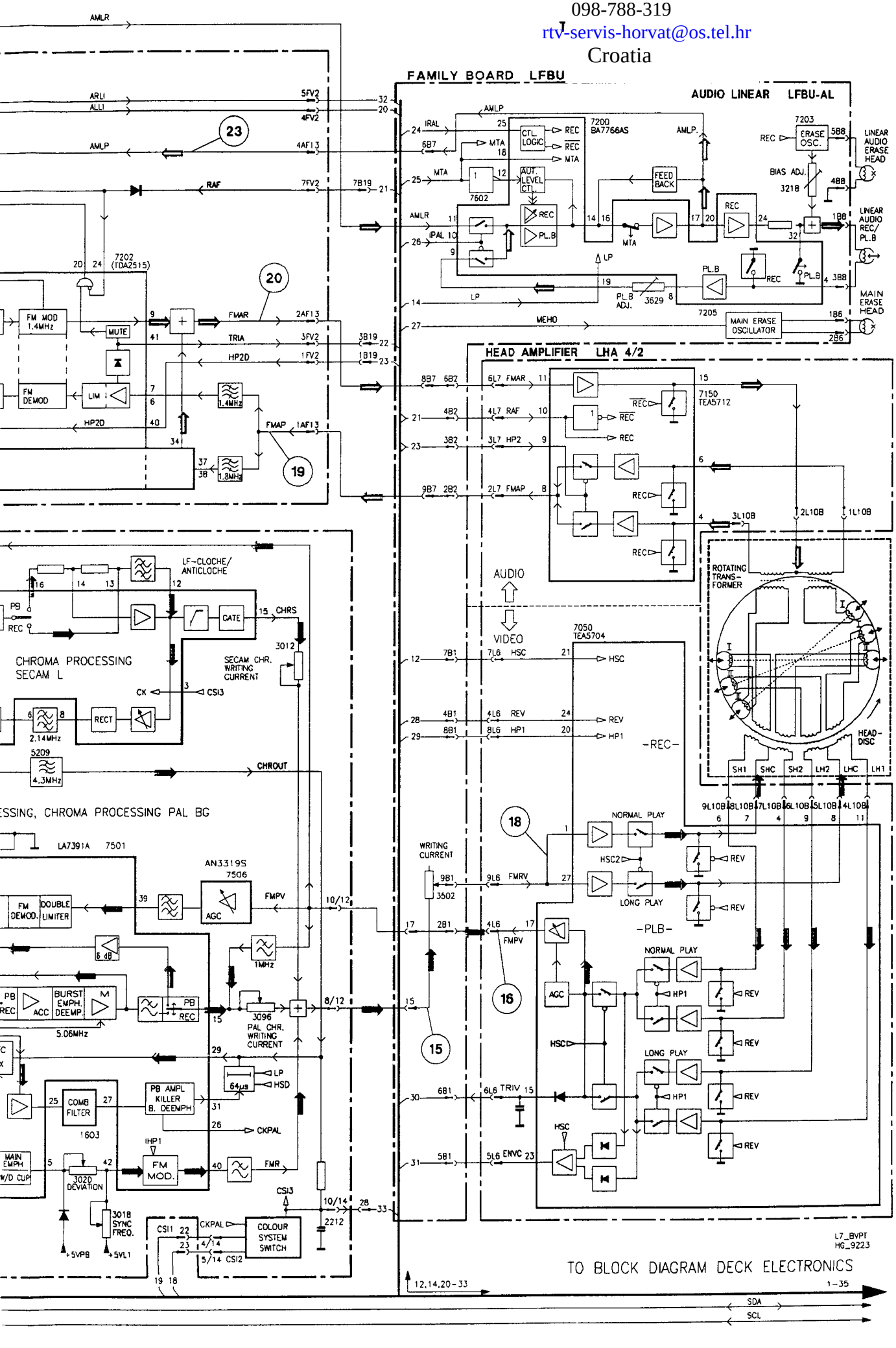
BLOCK DIAGRAM SIGNAL ELECTRONICS FOR VPT



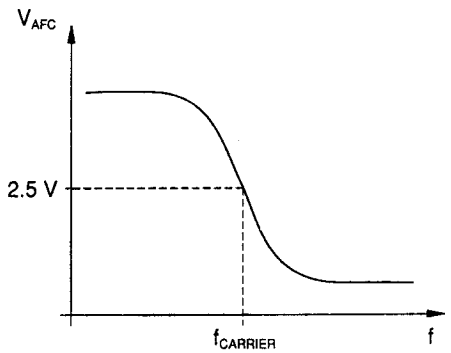

FM AUDIO LAF-AF
VPT PART OF CONTROL BOARD LCOVPT
SCART 1
V1I SC1 VIDEO IN
CINCH LEFT IN
AUDIO LEFT IN
SAI1 SAI2
1/2 7504
LOGIC
3 1/2 7505
MONO INPUT SELECT
AMLR
ALFP
ARFP
DUBM SC18
LEFT IN
CINCH RIGHT IN
AUDIO RIGHT IN
RIGHT IN
AFVR
AFVM
AFVL
TVSP1 VIEW SAI1 SAI2 TVSP2 SC18 ESS2 ESS1
SHIFT REGISTER
7513
STR
CLKD
DATD2
V1I DUBM
2B7
8AF13
ALFP 20
AMCO 12
1B7
9AF13
ARFP 19
4B7
6AF13
ALFR 32
7B7
3AF13
AMM 18
3B7
7AF13
31
ARFR
LIN RIGHT LEFT
OUTPUT SELECT
REC
PB.
AGC
20kHz
NOISE REDUCTION
– LEFT CHANNEL
– RIGHT CHANNEL
SDA
SCL
6B19 2B19 7B5
6FV2 2FV2 7FV1
1,3,34,36–39,42
ONLY PAL
IFMNS
FOR PAL I
7096
SHIFT REGISTER
CONTROL SIGNALS
7770
RAM
7780 SAA 5231
7760
VIDEO PROCESSOR
COMPUTER CONTROLLED TELETEXT
VIDIN
R G B
RGB CVBS
7790
BLANK
VIDOUT
VSB 3VT3
7795
CVBS INPUT SELECT
7785
TXPBV
FPOS
8VT3
1VT3
10B14
IPBV
ESS1 ESS2
7601 SDA5642
VPS DECODER
IF
1720
1721
IPSS
7720 TDA 3842
SOUND TRAP
VFV
5FV1
AGC DET.
AFC DET.
VIDEO RECOG
VIO
AFCA
3FV3
5FV3
AGC
IPSS POR IMAM
ISBI IMIF IFMNS IMON
IIC PORT EXPANDER
7760
1FV3
AMCO
IIC BUS
7FV3 7B4
1FV1 1B5
2B9 12CO1
1B9 13CO1
2,4,12–17,35
PLAYBACK AUDIO


FM AUDIO LAF-AF
SIGNAL ELECTRONICS PMS
7205 TDA2518
LEVEL CONVERTER
LOGIC
OUTPUT SELECT
LIN
RIGHT
LEFT
SDA SCL
AMLR
ARLI
ALLI
AMLP
RAF
PBMUTE
5FV2
4FV2
4AF13
7FV2
7B19
ALFP
AMCO
ARFP
ALFR
AMN
ARFR
AGC
REC
PB.
20kHz
NOISE REDUCTION
- LEFT CHANNEL -
- RIGHT CHANNEL -
1.4MHz
CENTER FREQ.
RECORD LEVEL
FM MAX. SWEEP
PLAY-BACK LEVEL
7202 (TDA2515)
I LIM
FM MOD 1.4MHz
SAMPLE AND HOLD
FM DEMOD
LIM I
MUTE
HP2D
FMAR
TRIA
FMAP
1.4MHz
1.8MHz
2AF13
3B19
3FV2
1B19
1FV2
1AF13
SDA
SCL
7520 TDA4725
FMPV
1.07MHz
:4
E-E
CHROMA PROCESSING
SECAM L
SECAM IDENT
HF-ANTI CLOCHE
x2
2.14MHz
RECT
GATE
CHRS
SECAM CHR. WRITING CURRENT
3012
CSI3
5209
4.3MHz
CHROUT
HF-CLOCHE
VBS
LF-CLOCHE/ ANTICLOCHE
LUMINANCE PROCESSING, CHROMA PROCESSING PAL BG
Y-PB LEVEL
3039
LA7391A 7501
AN3319S 7506
AGC
MAIN
FM DEMOD.
DOUBLE LIMITER
FMPV
1MHz
6 dB
4.43MHz
VXO
XO
627kHz
PHASE SHIFTER
321xfH PLL
SYNC
SP/LP
IHP1
5.06MHz
BURST EMPH. DEEMP.
ACC
M
3096 PAL CHR. WRITING CURRENT
W/D CLIP
Y/C MIX
NL
PICTURE CONTROL
SHP
COMB FILTER
1603
PB AMPL KILLER B. DEEMPH
64µs
LP
HSD
CKPAL
D.O.COMP LINE NOISE CANCELLER
3.5MHz
DETAIL ENHANC
MAIN EMPH
NLC
W/D CLIP
3020 DEVIATION
FM MOD.
FMR
AGC DET
SYNC SEP
CSYNC
7504
CCD
3010 EE LEVEL
3018 SYNC FREQ.
+5VPB
+5VL1
CSI1
CSI2
COLOUR SYSTEM SWITCH
2212
OF CONTROL BOARD LCOVPT
7096 SHIFT REGISTER
STR
CLKD
DATD1
CONTROL SIGNALS
7770 RAM
SAA 5231 7760
COMPUTER CONTROLLED TELETEXT
R G B
RGB CVBS
7790
BLANK
VIDIN
7785
TXPBV
FPOS
7795
8VT3
3B14
1VT3
7601 SDA5642
VPS DECODER
VSB
IPBV
HSD
CROT
LP
SCL
SDA
2,4,12-17,35
12CO1
13CO1

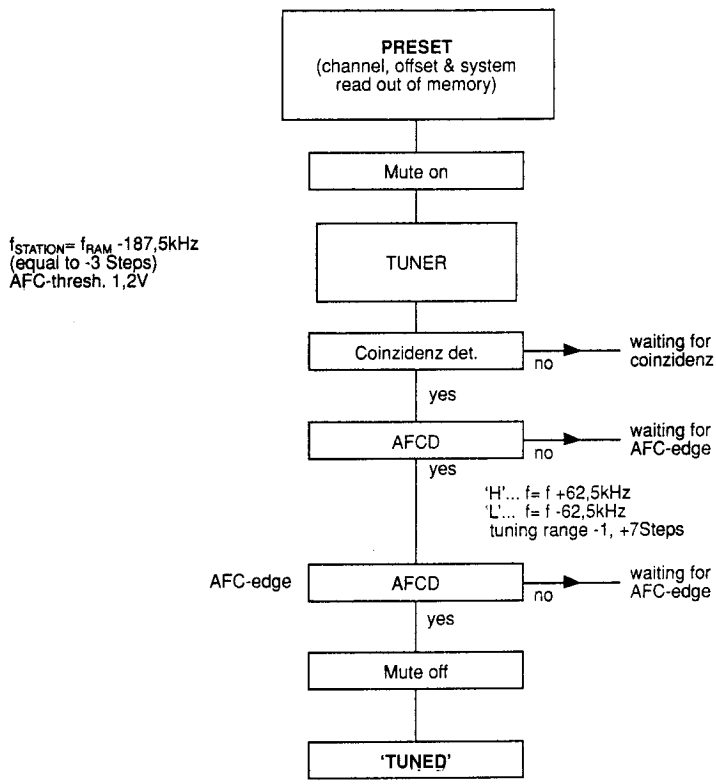
RTV servis Horvat
Kešinci, 31402 Semeljci
031-856-139
031-856-637
098-788-319
rtv-servis-horvat@os.tel.hr
Croatia



increased by 1.5MHz and the next channel is searched. If a video signal is identified, the fine tuning is incremented in steps of 62.5kHz, until the negative going AFC edge and therefore the carrier position is identified.In multi-standard sets, once the carrier is found and it is established as being a television signal the next step is to identify the system of the signal; i.e. PAL BG or SECAM L. This is done by identifying the frequency spacing between the vision and sound carriers. To achieve this, once the vision carrier is found, the tuning frequency is incremented by 5.5 then 6.5MHz and at each step the AFC is used to check for the presence of a sound carrier. When the system has been identified the tuning is reset to the vision carrier frequency.

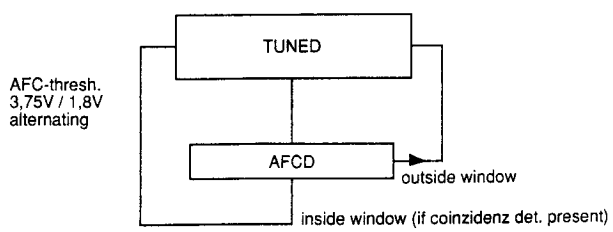


Program tuning (Station recall via PRESET no.)



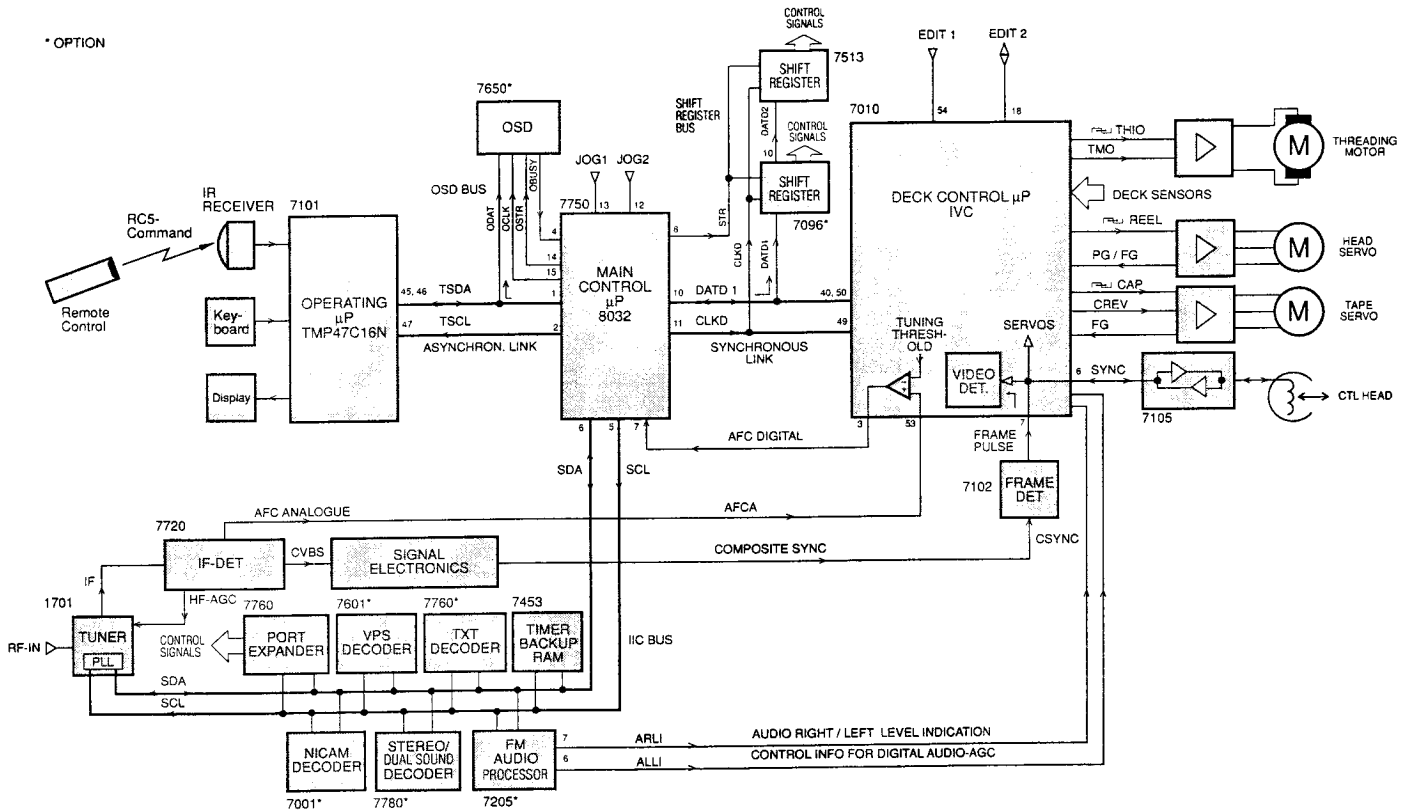
This block will be passed in following modes: PRESET recall, UP, DOWN

TUNED block (drift correction at switched-on front end)



New AFC-data will be not adapted into memory
This block is always active at switched-on front end.

BLOCK DIAGRAM TUNING & CONTROL



Functions of the microprocessors

Tasks of the operating µP
- Keyboard scanning
- Remote control decoding
- Display driving

Tasks of the main control µP
- Control of the entire unit, including all IIC components (e.g. tuner, timer back-up RAM, VPS, Nicam, port expander, FM Audio, stereo decoder)
- Tuning
- FM Audio AGC by means of the levels of ARLI and ALLI, measured by the deck µP
- Control of the on-screen display
- Supplying the bytes for the shift registers
- Calculation of the linear tape counter. The values for the rotation periods of the winding disks are received by the controller of the deck µP.
- Decoding of the Jog/Shuttle turning knob

Tasks of the deck µP
- Driving the motors, servo control
- Control of the tape drive sensors
- Measuring of analog levels (tracking; ARLI, ALLI for Audio; AFC for tuning; Pin 8 of Scart 2)
- Video identification via the separated picture sync
- Synchro edit
- Calculation of the nonlinear tape counter
- Fast winding:

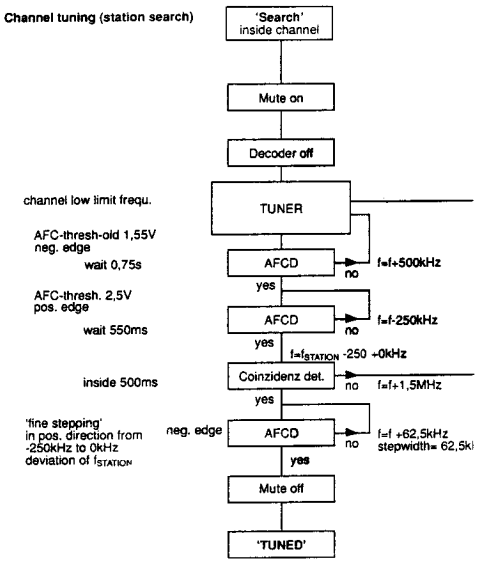
An additional software routine facilitates by means of the linear tape counter a fast winding. For this purpose, the cassettes are distinguished by the size of the hub in cassettes < E180, > E180 and VHS C. The identification does not depend on the length of the cassette, which has been entered manually at the unit.
- Generation of the levels for the test pattern in TPC units.
- Supply of the sharpness regulating signal.

Communication deck µP - control µP
The serial interface of the deck µP works in shift register mode. The controller emulates the interface by software via 2 portpins. Master is the controller, which therefore also generates the clock.
The transmissions are carried out every 3,125 ms. Bytes 0...14 are reserved for the controller as transmittal bytes. Bytes 15...29 come from the deck µP. A subsequent break of 2 . 3,125 ms, where no transmission is carried out, serves the deck µP for synchronization. A complete transmission takes therefore 32 . 3.125 ms = 100 ms.

Communication control µP - operating µP
In this serial connection, the controller is also master. The operating µP uses its hardware serial interface, whereas the controller generates the connection by two portpins by means of software.
The connection is asynchronous, the synchronization being effected by the timing between two bytes. The time between two bytes of the same functional bloc is between 1 ms and 1,6 ms. The time between two bytes of different functional blocks has to be at least 4,5 ms.

Station search

The station search and selection is controlled by the main control microprocessor 7750. It determines the tuning frequency and passes it to the tuner via the IIC bus. The AFC (Automatic Frequency Control) relies on the presence of a carrier to obtain information. The AFC is generated in the IF amplifier/demodulator IC7720 and passed to an analogue input (pin 53) of the deck control microprocessor. The signal is referred to as AFCA (AFC analogue). Whithin the deck control IC7010 the AFC is compared with an AFC threshold value obtained from the control processor via the serial bus DATD1, CLKD. The line AFCD (AFC digital), is generated as a result of this comparison and fed to one input



This block will be passed in following modes: STORE,SEARCH, PRESET recall without RAM-data (f.i. via remote control programmed).

of the main control processor. If there is no carrier, the AFC voltage, due to noise, is relatively undefined in the middle of the AFC range. The station search starts at the lowest frequency and is incremented in 500kHz steps. When a step results in the AFC voltage falling below the AFC threshold of 1,55V the search direction is reversed and the step reduced to 250kHz. The AFC voltage falling below 1,55V (see the diagram AFC characteristics) identifies the negative going edge of the AFC response. The 250kHz steps reduce the search frequency until the positiv edge of the AFC response is reached (AFC voltage greater tha 2,5V). The search is then stopped for 550ms to establish if the carrier just found is modulated with a video signal. The operation is carried out by checking the signals for syncs. The Sync (CSYNC) is separated from the video on the signal electronics, and passed to the deck electronics. The picture sync is filtered out by a low pass filter and comparator 7102, before being checked in the deck microprocessor (coincidence detector). If the carrier found is not modulated with a video signal, the tuning frequency is

Power supply LSM 45

Adjustment of the output voltage of LSM 45 (3204)

- Bring unit into mode "Play back".
- Connect a voltmeter to connection 4 or 6 of the plug SM1
- Adjust to an output voltage of 5,2 V ± 0,03 V by means of 3204 .

Einstellung der Ausgangsspannung von LSM 45 (3204)

- Gerät in den Wiedergabemodus bringen
- An Anschluß 4 oder 6 vom Stecker SM1 ein Voltmeter anschließen
- Mit 3204 auf eine Ausgangsspannung von 5,2 V ± 0,03 V einstellen

Reglage de la tension de sortie de LSM 45 (3204)

- mettre l'appareil sur la position "Lecture"
- Brancher un voltmètre sur la connexion 4 ou 6 de la prise SM1
- Ajuster 3204 de manière que l'on ait une tension de sortie de 5,2 V ± 0,03 V

Instelling van de uitgangsspanning van LSM 45 (3204)

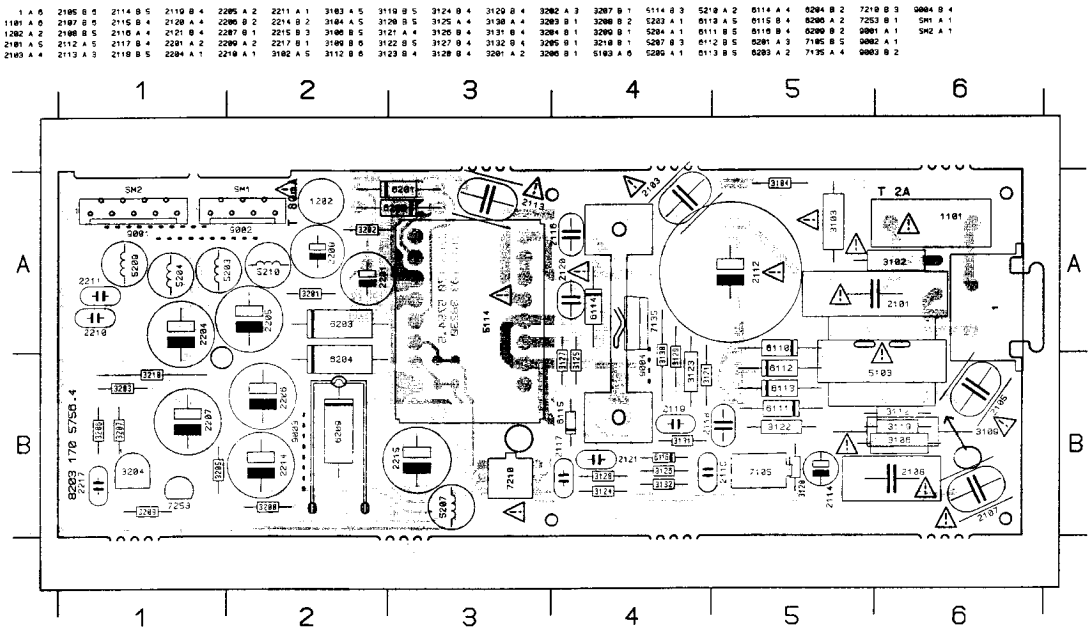
- toestel op "Weergave" schakelen
- Sluit op aansluiting 4 of 6 van de stekker SM1 een voltmeter aan.
- Stel met behulp van 3204 een uitgangsspanning van 5,2 V ± 0,03 V in.

Regolazione della tensione d'uscita di LSM 45 (3204)

- portare il registratore in posizione "Riproduzione"
- Collegare un voltmetro a Pin 4 o 6 della presa SM1
- Regolare con 3204 ad una tensione d'uscita di 5,2 V ± 0,03 V

Ajuste de la tension de salida de LSM 45 (3204)

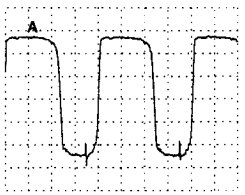
- Colocar el aparato en posición de "Reproducción"
- Conecte un voltímetro al Pin 4 o 6s del conector SM1
- Ajuste con 3204 a una tensión de salida de 5,2 V ± 0,03 V



A: DC, 2V/Div, 2us/Div

Osc 4
5/7105

A: DC, 0.2V/Div, 2us/Div

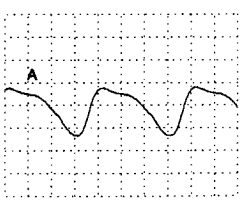


Osc 5
8/7105

A: DC, 10V/Div, 2us/Div

Osc 6
4/5114

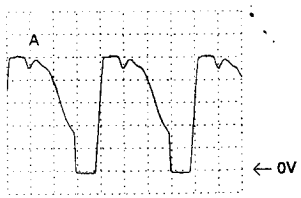
A: DC, 5V/Div, 2us/Div



Osc 7
8SM2 HEHI

Oscillograms are measured to Live ground except Osc 7 and Osc 8 (HEHI, HELO)

A: DC, 0.1kV/Div, 2us/Div

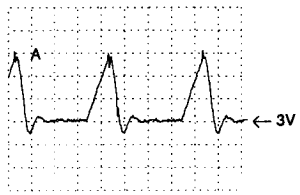


Osc 1
Drain 7135

A: DC, 2V/Div, 2us/Div

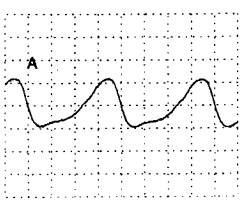
Osc 2
Gate 7135

A: DC, 0.2V/Div, 2us/Div



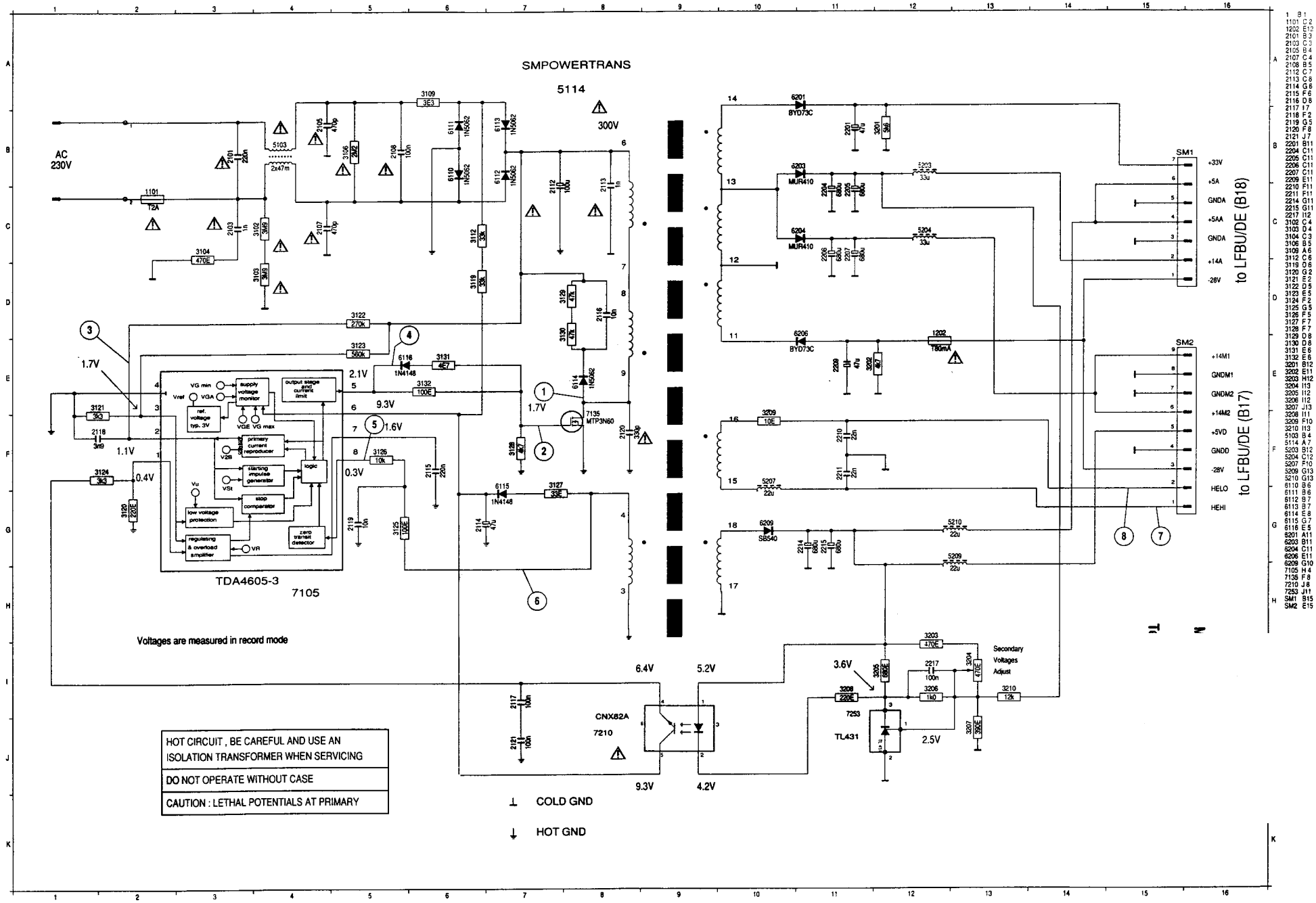
Osc 3
2/7105

A: DC, 5V/Div, 2us/Div



Osc 8
9SM2 HELO

POWER SUPPLY LSM45



CS 37017

3-4

CIRCUIT DESCRIPTION OF THE SWITCH MODE POWER SUPPLY LSM 45

Typical data:

- Mains voltage: 175 - 265 V_{rms} / 45-65 Hz
- Max. power: 40 W
- Switching frequency: 20-120 kHz
- all outputs are short circuit protected
- efficiency 78% at max. load

Function description (blocking oscillator principle)

During the **forward phase** energy is transferred from the mains into the transformer. This energy is then supplied to the load during the off-time of the switching transistor. By control of the switch-on time the energy which is transferred in each cycle is regulated so that the output voltages are independent of load or inp'.t voltage variations. The power transistor is controlled by the by the integrated circuit TDA4605.

Description of different load-conditiones

NO LOAD: The SMPS works in **burst mode** (polling operation mode). That means,it will start up. After some cycles the SMPS is switched off because the output-voltage becomes too high. After the output-voltage has been reduced the SMPS will start up again

REGULATION-RANGE: The switching frequency is reduced with increasing load. The duty cycle is mainly controlled by the mains voltage. The output-voltage is not very much load controlled.

POINT OF REVERSAL: At this point of the output characteristics the transferred power is at maximum

OVERLOAD: The SMPS also works in **burst mode**. The energy in each cycle is limitted so that the output voltage is reduced.

Circuit description

C2414 becomes charged via R3112 and R3119 and provides the supply for the start-up phase of IC7105. After this start-up phase the supply is provided by the transformer's winding 3-4 via R3127, D6115. BUZ90A is the switching transistor of the SMPS. Capacitor C2120 and the inductivity of the primary winding 6-9 determine the system frequency of the circuit.

During forward phase the switching transistor is conductive, and current will flow from the positive supply at pin 6 through the transformer's primary winding and the transistor to ground. As the positive voltage at pin 6 of the transformer is constant, the current will increase linearly and create a ramp dependent on the mains voltage and the inductance of the primary winding. A certain amount of energy is stored in the transformer in the form of a magnetic field. The polarity of the voltages at the secundary windings are such that the diodes are non-conducting. Pin 2 of the IC sources a constant current during the switch on time. This current charges C2118 and creates a sawtooth voltage which represents the primary current. At the same time the voltage is checked and the switching transistor is turned off when the voltage reaches a certain value which is dependent on the regulating voltage on pin 1. The values of C2118 and R3122 are chosen to ensure that the transformer core cannot become saturated.

When the switching transistor is switched off energy is no longer supplied to the transformer. The inductance of the transformer now tries to maintain the current which has been flowing through it at a constant level (v=L*di/dt). The polarity of the voltage from the transformer therefore becomes reversed. This results in a current flow through the transformer's secondary winding via the diodes and electrolytic capacitors and the load. This current is also ramp shaped (but decreasing).

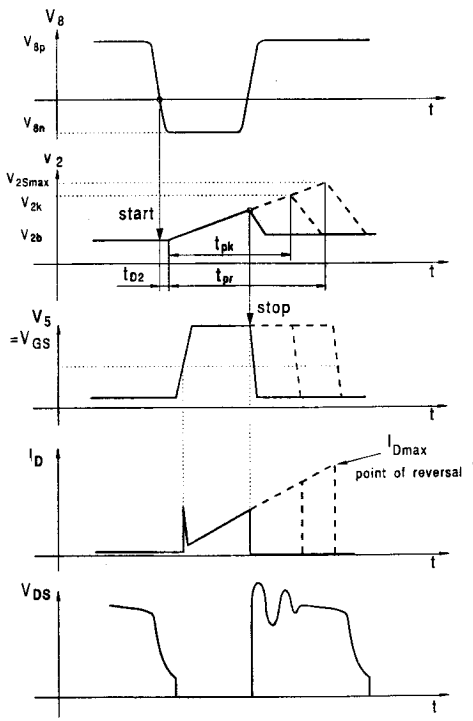


Fig. 1

When the whole of the energy stored in the transformer has been supplied to the load and the magnetic field has disappeared, the voltage from the secondary windings falls bellow the output voltage - which is held constant by the electrolytic capacitors - plus the threshold voltage of the diodes. The current in the secondary winding therefore ceases. At this point the drain-source voltage of the switching transistor is not yet zero because capacitor C2120 contains a certain charge. This charge will start a sine-shaped ringing together with the transformer's self-induction. When the sine-wave passes through zero IC4605 detects this at pin 8. The switching transistor is now switched on again and a new cycle starts.

Regulation of the SMPS is done by altering the conduction time of the switching transistor so that either more or less energy is transferred from the mains into the transformer. The control information is derived from the reference component 7253 which monitors the output voltage of the SMPS. The result is fed to pin 1 of the TDA4605 via an opto-coupler for electrical isolation. The TDA4605 compares the voltage against an internal reference. The resulting value shifts the reference with which the voltage at pin 2 (the image of the primary current) is compared.

IC7253 is a reference-component with an internal 2,4 V reference voltage and a nominal/ actual-value compare circuit.

C2116, R3129, R3130 and D6114 form a snubber network which limits the peak voltage at switch-off.

The ringing seen in both voltages and currents is caused by stray selfinductances in the transformer. Therefore a passage through zero at pin 8 will be ignored after T7135 has been switched off (4 µs internally fixed). In addition R3125 and C2119 suppress over-shoots.

R3128 is a pull-down resistor to remove static charges from the gate of T7135.

The voltage of pin 3 of TDA4605 is required for the point of reversal current which is an additional correction current for capacitor C2118. This current shortens the on-time of T7135 by charging C2118. The point of reversal is also stable at higher mains voltage. In addition R3128 and R3121 determine the minimum mains voltage below which the SMPS will not work.

Pin 7 is an option. By applying C2115 the start-up phase will be carried out with shortened pulses so that the switching frequency is outside the audibility range.

On the secondary side there are 5 voltages present, rectified by D6201-D6209 and filtered by C2201-C2215. In some cases two electrolytic capacitors in parallel are used to increase the ability to handle pulse currents.

Items 5203-5210 are RF-filter coils which block disturbances caused by clock frequencies of µPs.

The circuit around coil 5103 is a mains filter.

Description of the "start-up-phase"

After mains connection, at moment t_0 following voltages at the pins of TDA4605 are increasing: (see Figure 2)

- V_6 according to half wave charge via R3112,R3119
- V_2 rising to V_{2max} (typical 6,6 V)
- V_3 rising to the fixed value of voltage divider R3121, R3123

Current consumption in this case is < 1,6 mA. The internal reference voltage is switched on at moment t_1 ($V_6=V_{6E}$).

Current consumption increases to 12 mA max.

The primary current to voltage converter regulates V_2 at V_{2B} and at the moment t_5-t_6 a start pulse is generated.

Feedback at pin 8 starts the next pulse and so on.

All pulses, start-pulse included, are pulse width controlled by the regulation voltage at pin 1. This voltage is in accordance with the "case of short circuit". Start up is realized by "short circuit pulses" which are extended depending on the regulation voltage.

At the moment t_2 the maximum pulse width is present ($V_2=V_{2Smax}$) - TDA4605 is now in "point of reversal mode". V_2 peaks decrease rapidly because the circuit is inside the regulation range. The regulation-loop is locked.

If V_6 drops below limit value V_{6min} before point of reversal is reached, start up will be stopped (pin 5 is switched low) and V_6 decreased to V_{6A} - IC is switched off.

When V_6 increases by half wave charge (see moment t_4) a new cycle can be started at moment t_1.

Start-up phase/ short circuit operation of TDA4605

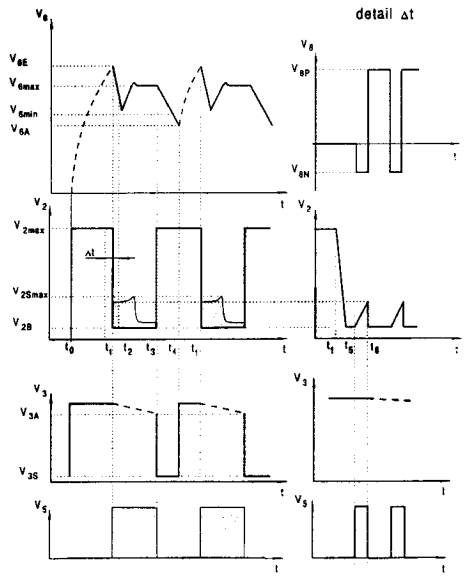


Fig. 2

3-5

Regulation-range, Overload and No-load

After start up the IC is within the regulation range. Voltage at pin 1 is typically 400 mV. In case of an increasing load on the secondary side the switch on time will also be increased. The peak voltage value at pin 2 also rises to V_{2Smax}. If the secondary load tries to increase again the overload amplifier would start to reduce the pulse width of V_5. This point is called "point of reversal". The IC supply voltage V_6 is related to the secondary voltage value. V_6 therefore decreases with increasing load due to the reduced pulse width of V_5.

At the condition $V_6 < V_{6min}$ TDA4605 changes to **burst mode** (polling operation mode). Short circuit power is small, because the time delay of the half wave start up is high (from the mains frequency). In this case the overload amplifier reduces the pulse width to a certain value (t_{PK}-mark). This minimum pulse width must be guaranteed because it is active in each start-up phase (V_1=0 V).

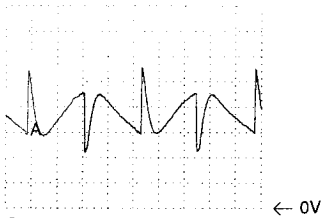
With decreasing load on the secondary side the pulse width of the switch on pulse (V_5=high) will also be decreased. Switching frequency will be increased to the system frequency of the circuit. If the output voltage is increased up to $V_6=V_{6max}$, the logic will be blocked and the TDA4605 will be in **burst mode**. SMPS works in open circuit operation.

Overtemperature

TDA4605 includes an over-temperature circuit which blocks the logic if the chip temperature becomes too high. Start up is possible after reduction of the temperature.

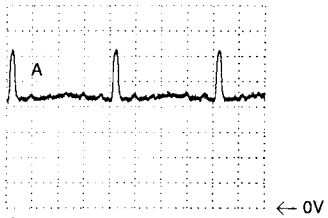
HEAD AMPLIFIER LHA 4/2, (4822 214 33817)

A: DC, 1 V/Div, 0.5 ms/Div



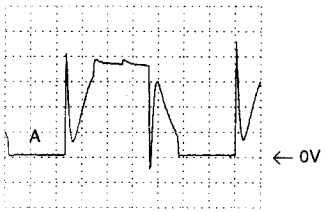
Osc 9
4L9

A: DC, 0.2 V/Div, 10 ms/Div



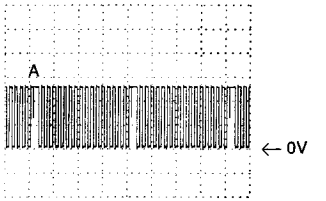
Osc 11
3L9

A: DC, 2 V/Div, 1 ms/Div



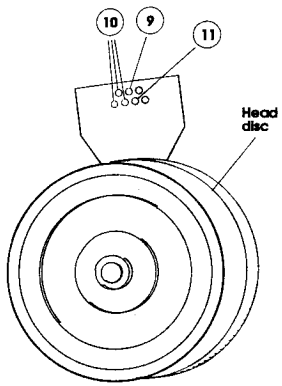
Osc 10

A: DC, 2 V/Div, 10 ms/Div

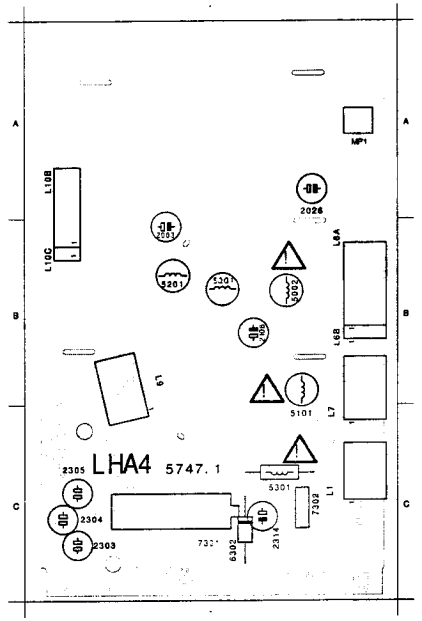


Osc 12
6L1 PG/FG

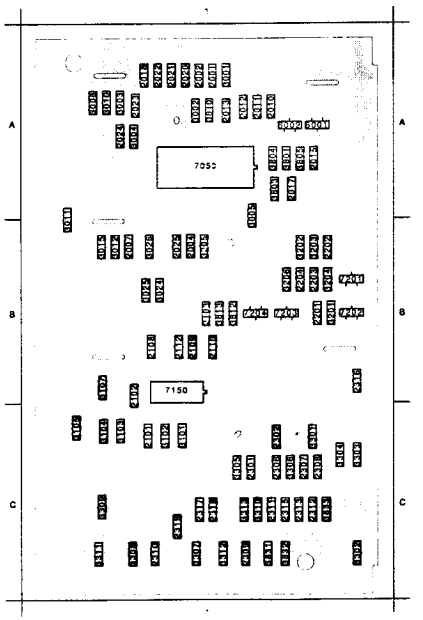
Oscillograms are measured in play back



Position of measuring points
Be careful when measuring. Don't touch the head disc!



L1 C 1
L10B B 1
L10C B 1
L6A B 1
L6B B 1
L7 C 1
L9 B 1
2003 B 1
2026 A 1
2106 B 1
2303 C 1
2304 C 1
2305 C 1
2314 C 1
5001 B 1
5002 B 1
5101 B 1
5201 B 1
5301 C 1
6302 C 1
7301 C 1
7302 C 1



2001 A 1
2002 A 1
2004 B 1
2007 B 1
2010 A 1
2011 A 1
2012 A 1
2013 A 1
2015 A 1
2017 A 1
2018 A 1
2020 A 1
2021 A 1
2022 A 1
2023 A 1
2024 A 1
2025 B 1
2101 C 1
2102 B 1
2103 B 1
2108 B 1
2109 B 1
2110 B 1
2112 B 1
2201 B 1
2202 B 1
2203 B 1
2204 B 1
2301 C 1
2302 C 1
2306 C 1
2307 C 1
2308 C 1
2309 C 1
2310 C 1
2311 C 1
2312 C 1
2313 C 1
2315 C 1
2316 B 1
2317 C 1
2318 C 1
2319 C 1
3001 A 1
3002 A 1
3003 A 1
3004 A 1
3005 A 1
3008 A 1
3010 A 1
3011 B 1
3012 B 1
3015 B 1
3024 B 1
3025 B 1
3026 B 1
3101 C 1
3102 C 1
3103 C 1
3104 C 1
3105 C 1
3107 B 1
3201 B 1
3202 B 1
3203 B 1
3204 B 1
3205 B 1
3208 B 1
3301 C 1
3302 C 1
3303 C 1
3304 C 1
3305 C 1
3306 C 1
3307 C 1
3308 C 1
3309 C 1
3310 C 1
3311 C 1
3312 C 1
3313 C 1
3601 A 1
3603 A 1
3804 A 1
3805 A 1
3810 A 1
3812 B 1
3813 B 1
3831 C 1
3832 C 1
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6002 A 1
7050 A 1
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7201 B 1
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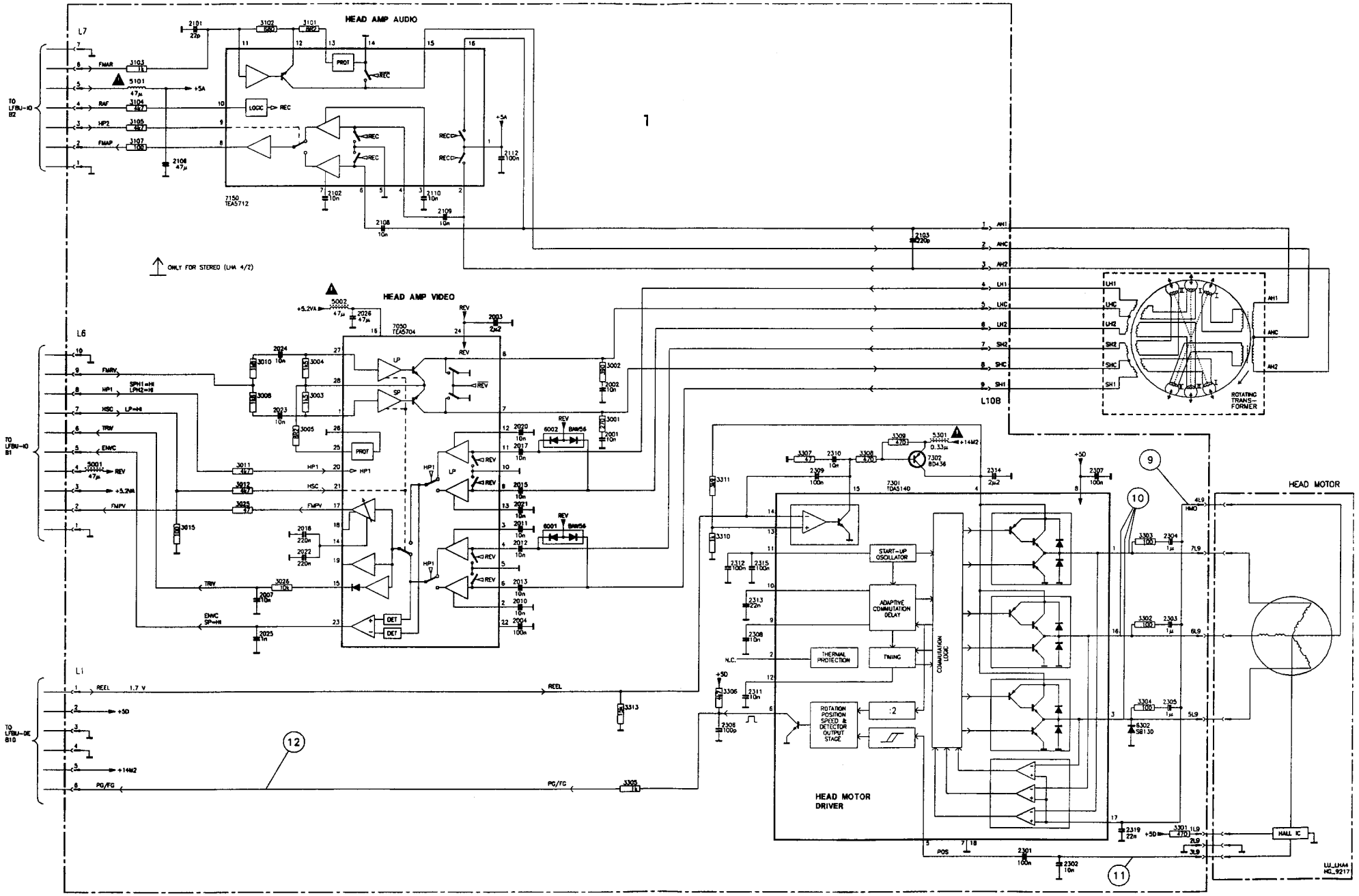
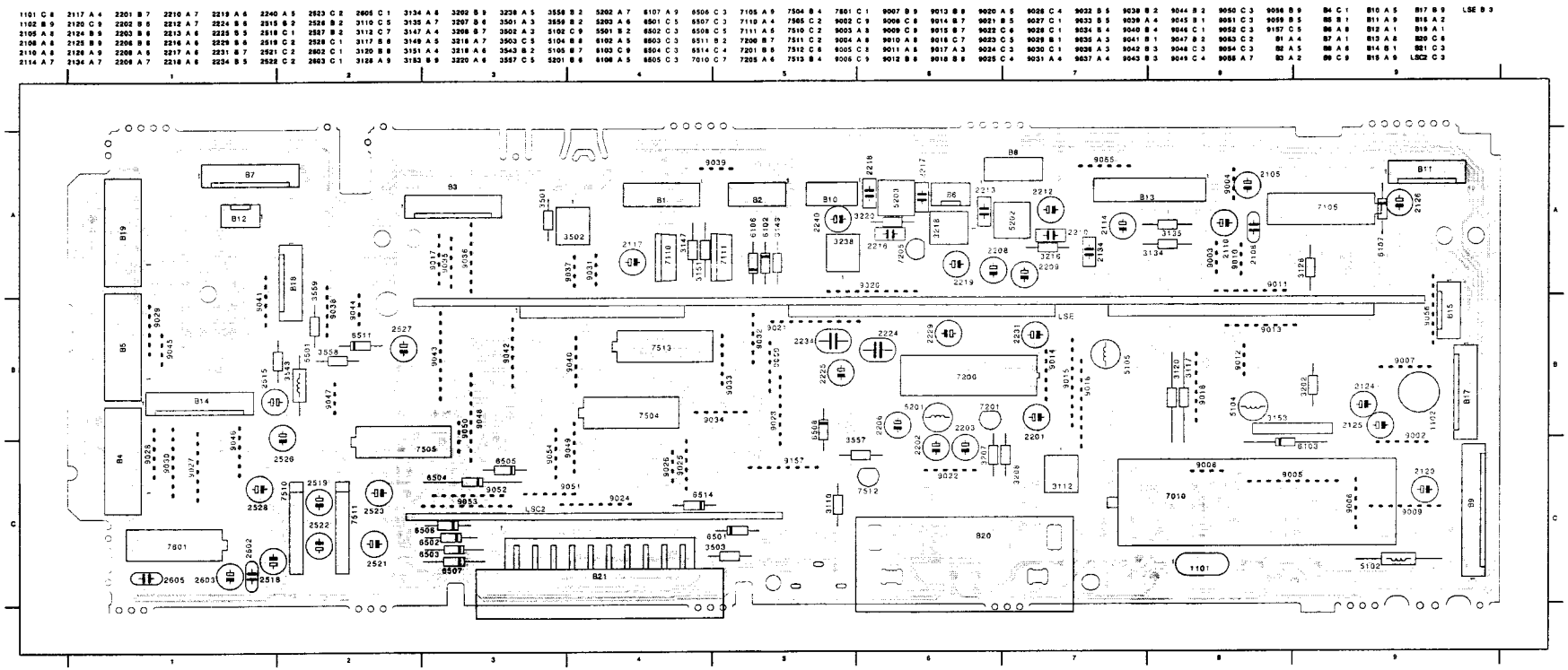
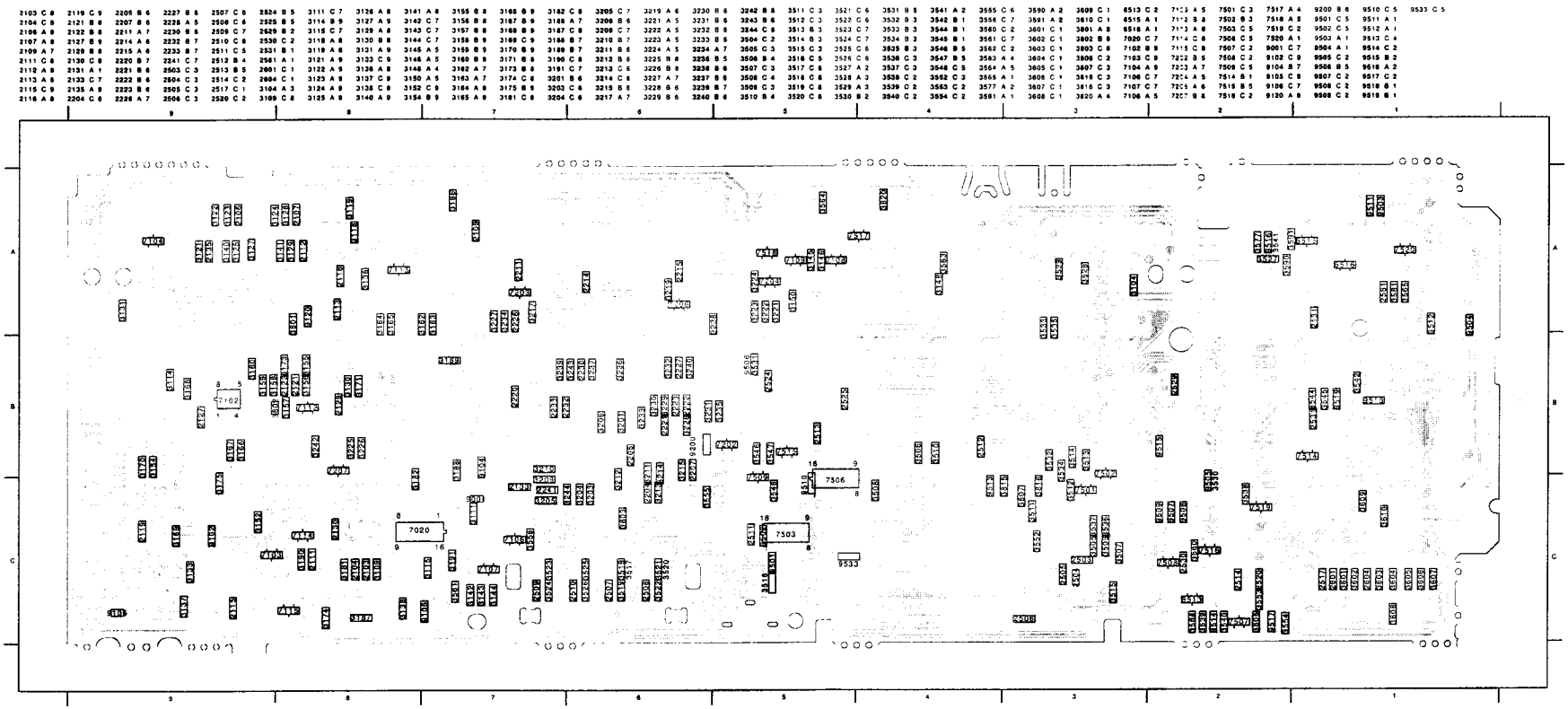

HEAD AMP AUDIO
HEAD AMP VIDEO
HEAD MOTOR
HEAD MOTOR DRIVER
ONLY FOR STEREO (LHA 4/2)
ROTATING TRANS-FORMER
L7
L6
L1
L10B
TO LFBU-IO B2
TO LFBU-IO B1
TO LFBU-DE B10
7150 TEA5712
7050 TEA5704
7301 TDA5140
7302 BD436
6001 BAW56
6002 BAW56
6302 S8130
START-UP OSCILLATOR
ADAPTIVE COMMUTATION DELAY
THERMAL PROTECTION
TIMING
COMMUTATION LOGIC
ROTATION POSITION SPEED & DETECTOR OUTPUT STAGE
HALL IC
REEL
PG/FG
POS
REC
PROT
LOGIC
DET
REV
HP1
HP2
RAF
RAB
FMAR
FMAP
FMPV
HSC
TRV
EMVC
LP
SP
AH1
AHC
AH2
LH1
LHC
LH2
SH2
SHC
SH1

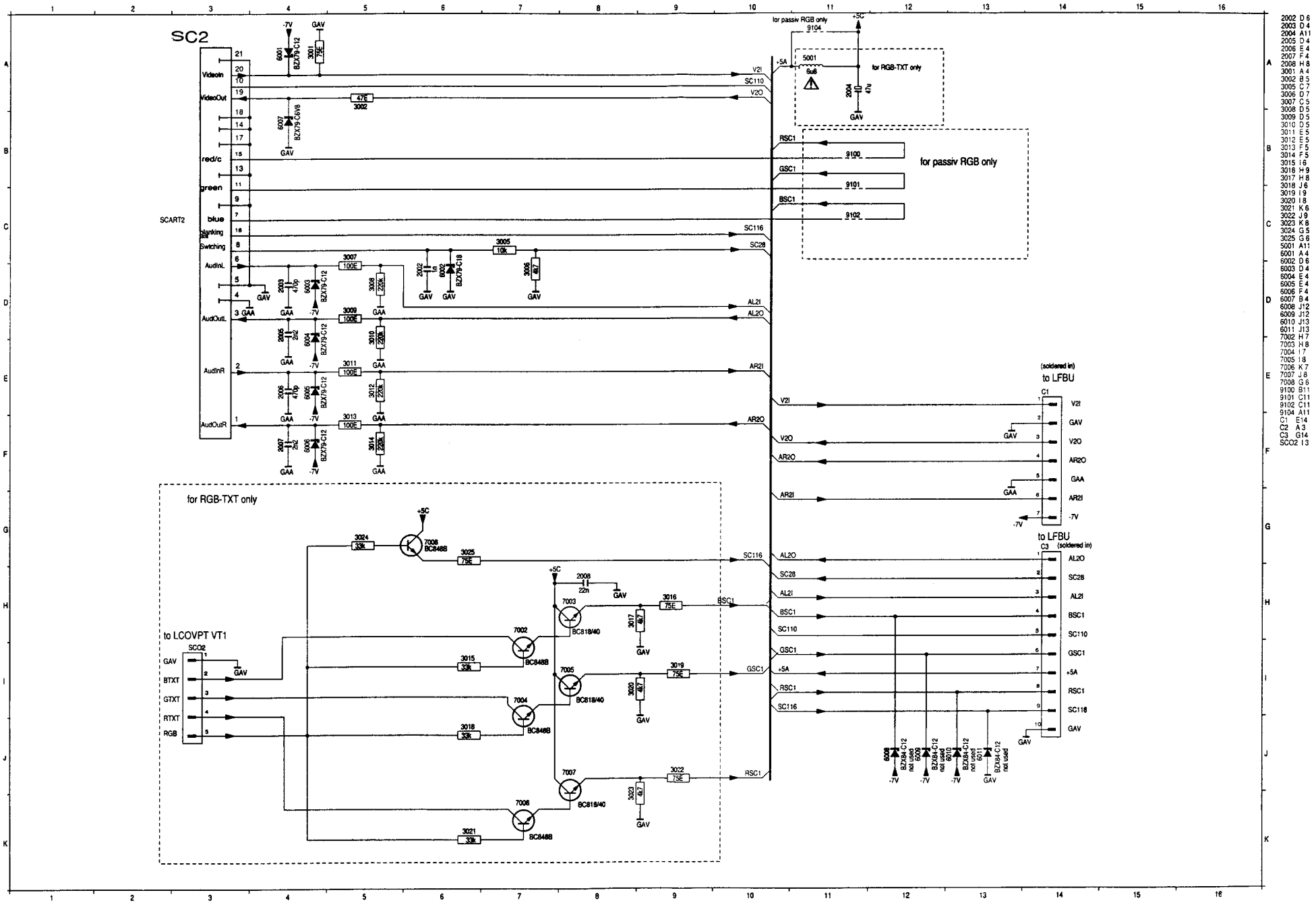
FAMILYBOARD LFBU



FAMILIYBOARD LFBU



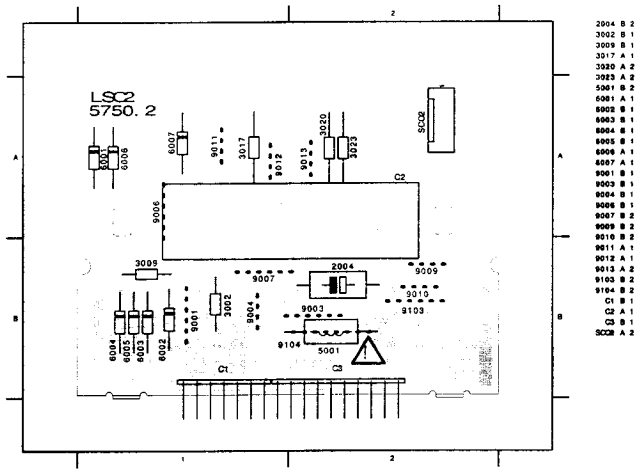
SCART PRINT LSC

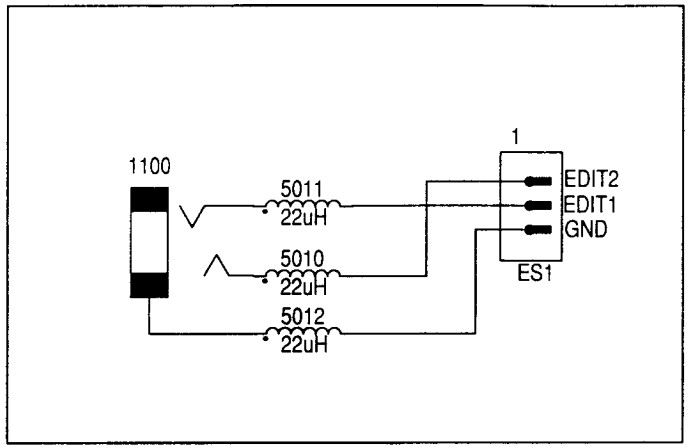


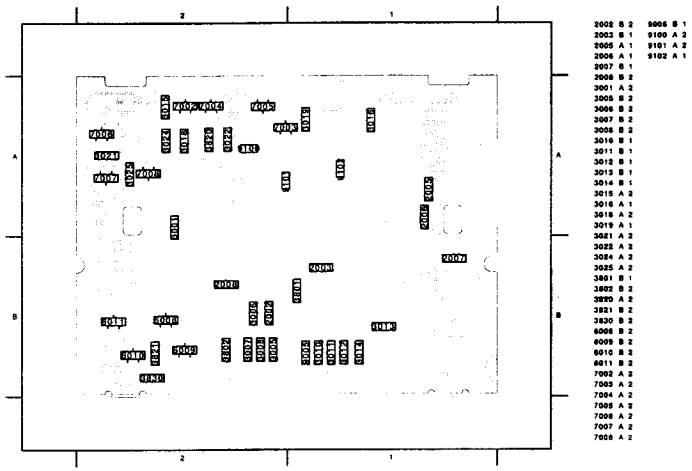
CS 37024

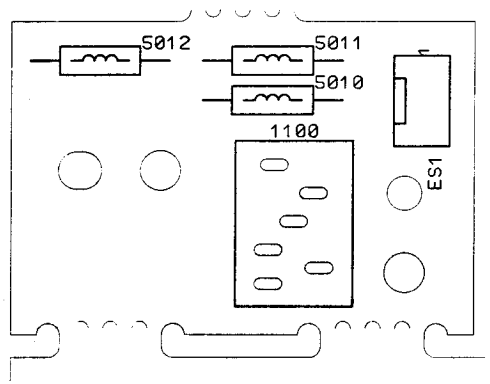
SCARTPRINT LSC

EDIT PCB LES









3-12

INPUT/OUTPUT LFBU-IO

Luminance record current setting (3502)
- Feed no signal
- Bring unit in mode "RECORD"
- Connect an oscilloscope to the record current measuring pin on the head amplifier
- Connect the chassis of the oscilloscope to the chassis pin and the screening of the head amplifier
- Set resistor 3502 so that the amplitude of the signal is 210 $mV_{pp} \pm 12$ mV_{pp}

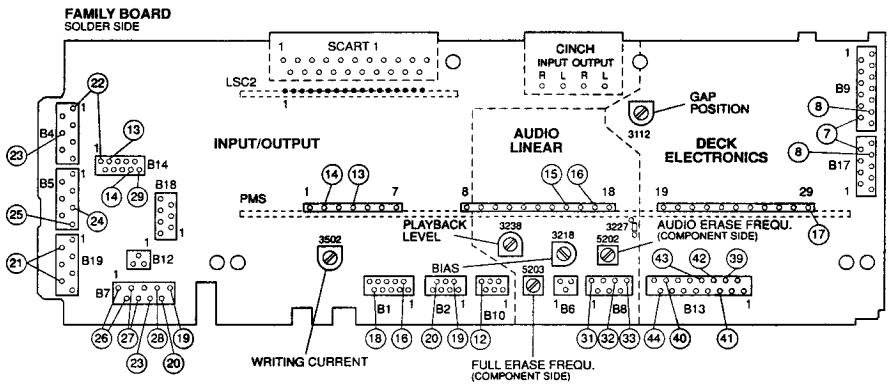
Luminanz-Schreibstromeinstellung (3502)
- kein Signal einspeisen
- eine Aufnahme machen
- an den Schreibstrom-Meßpin des Kopfverstärkers ein Oszilloskop schalten
- die Masse des Oszilloskops mit dem Massepin und der Abschirmung des Kopfverstärkers verbinden.
- Widerstand 3502 so einstellen, daß die Amplitude des Signals 210 $mV_{ss} \pm 12$ mV_{ss} beträgt.

Réglage du courant d'écriture de luminance (3502)
- ne pas appliquer de signal
- positionner l'appareil sur la position "ENREGISTREMENT"
- brancher un oscilloscope sur la broche de mesure du courant d'écriture de l'amplificateur de tête
- relier la masse de l'oscilloscope à la broche de masse et au blindage de l'amplificateur de tête.
- régler la résistance 3502 de telle façon que l'amplitude du signal s'élève à 210 $mV_{cc} \pm 12$ mV_{cc}.

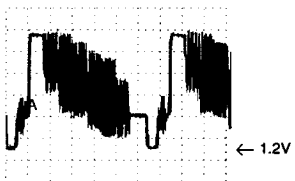
Instelling van de schrijfstroom voor het helderheidsignaal (3502)
- Geen signaal ingeven (programma E1)
- toestel op OPNAME" schakelen
- op de schrijfstroommeetpin van de kopversteerker en oscilloscoop aansluiten
- de massa van de oscilloscoop met de massapin en de afscherming van de kopversterker verbinden
- weerstand 3502 zodanig instellen dat de amplitude van het signaal 210 $mV_{tt} \pm 12$ mV_{tt} bedraagt

Regolazione della corrente di registrazione di luminanza (3502)
- non applicare nessun segnale (programma E1)
- portare l'apparecchio in posizione REGISTRAZIONE"
- collegare un'oscilloscopio al Pin di misurazione della corrente di registrazione (preamplificatore testine)
- collegare la massa dell'oscilloscopio con il Pin collegato a massa e con la schermatura del preamplificatore testine
- regolare il potenziometro 3502 in modo che l'ampiezza del segnale indichi 210 $mV_{pp} \pm 12$ mV_{pp}

Regulación de la luminancia-corriente de escritura (3502)
- No alimentar ninguna señal (Programa E1)
- Poner el aparato en posición de "GRABACION"
- Conectar un osciloscopio al conector de medición de la corriente de escritura (amplificador de cabezas)
- Conectar la masa del osciloscopio con el conector de masa y la protección antiparasitaria del amplificador de cabezas
- Regular la resistencia 3502 de forma que la amplitud de la señal sea de 210 $mV_{ss} \pm 12$ mV_{ss}

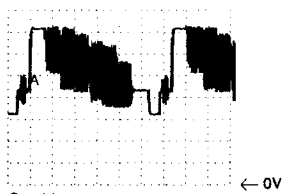


A: AC, 0.2 V/Div, 10 us/Div



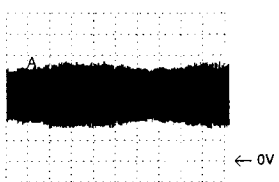
Osc 13
Connector 4/LSE, 3B14 VBS

A: DC, 0.5 V/Div, 10 us/Div



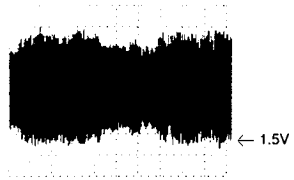
Osc 14
Connector 2/LSE, 8B14 VSB

A: DC, 0.2 V/Div, 10 us/Div



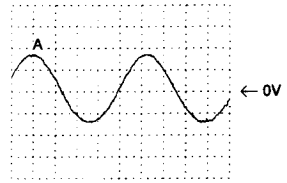
Osc 15
Connector 15/LSE FMRV

A: AC, 50 mV/Div, 10 us/Div



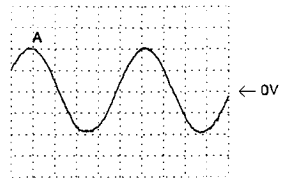
Osc 16
Connector 17/LSE, 2B1 FMPV

A: DC, 0.5 V/Div, 0.2 ms/Div



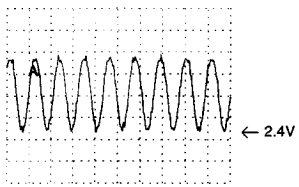
Osc 21
2/6 B19 AFVL/AFVR

A: DC, 0.5 V/Div, 0.2 ms/Div



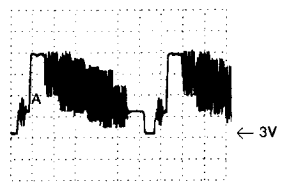
Osc 26
1/2 B7 ARFP/ALFP

A: AC, 0.2 V/Div, 0.2 us/Div



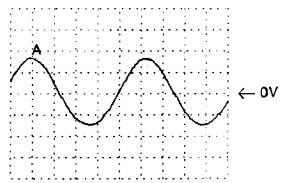
Osc 17
Connector 29/LSE FSC

A: AC, 0.5 V/Div, 10 us/Div



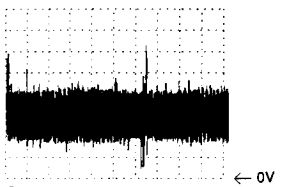
Osc 22
1B4, 1B14 VIDOUT

A: DC, 0.5 V/Div, 0.2 ms/Div



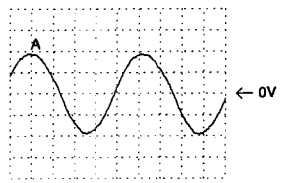
Osc 27
3/4 B7 ARFR/ALFR

A: DC, 0.1 V/Div, 10 us/Div



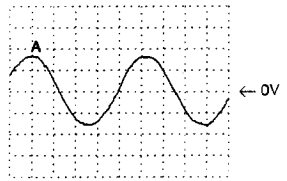
Osc 18
9B1 FMRV

A: DC, 0.5 V/Div, 0.2 ms/Div



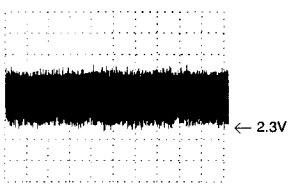
Osc 23
4B4 AMLP

A: DC, 0.5 V/Div, 0.2 ms/Div



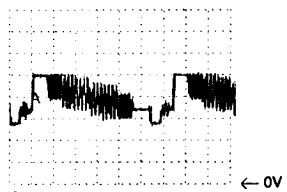
Osc 28
7B7 AMM

A: AC, 0.2 V/Div, 5 ms/Div



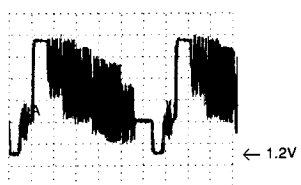
Osc 19
2B2, 9B7 FMAP

A: DC, 0.5 V/Div, 10 us/Div



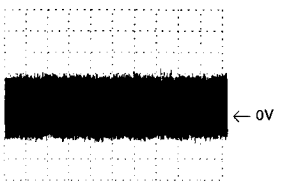
Osc 24
5B5 VFV

A: AC, 0.2 V/Div, 10 us/Div



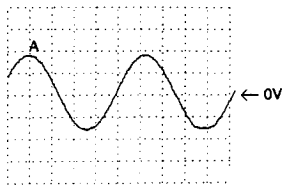
Osc 29
10B14 VIDIN

A: DC, 0.2 V/Div, 5 ms/Div



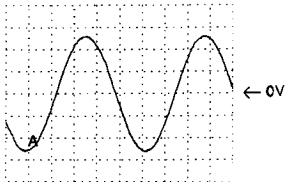
Osc 20
6B2, 8B7 FMAR

A: DC, 0.5 V/Div, 0.2 ms/Div



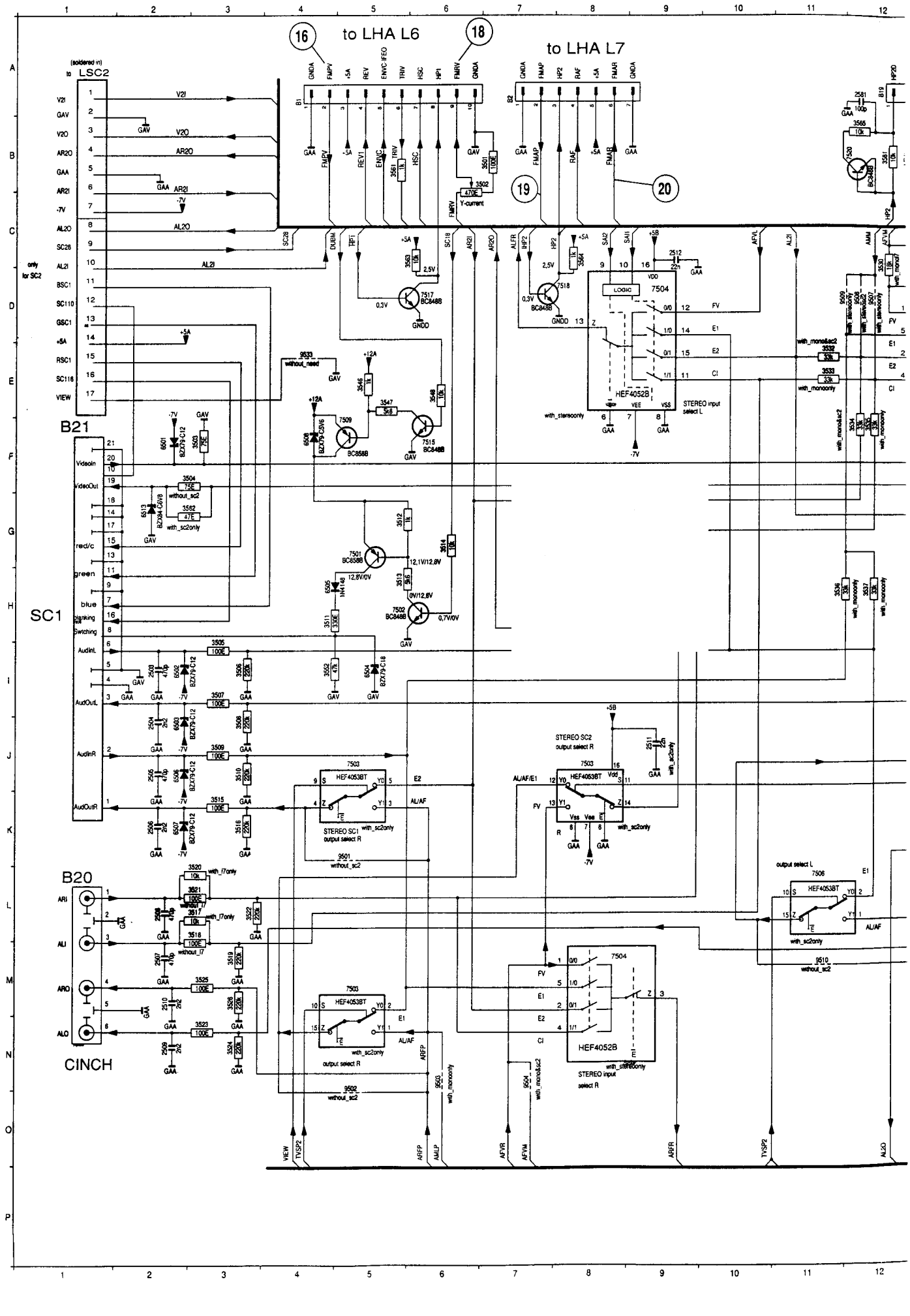
Osc 25
7B5 AFVM

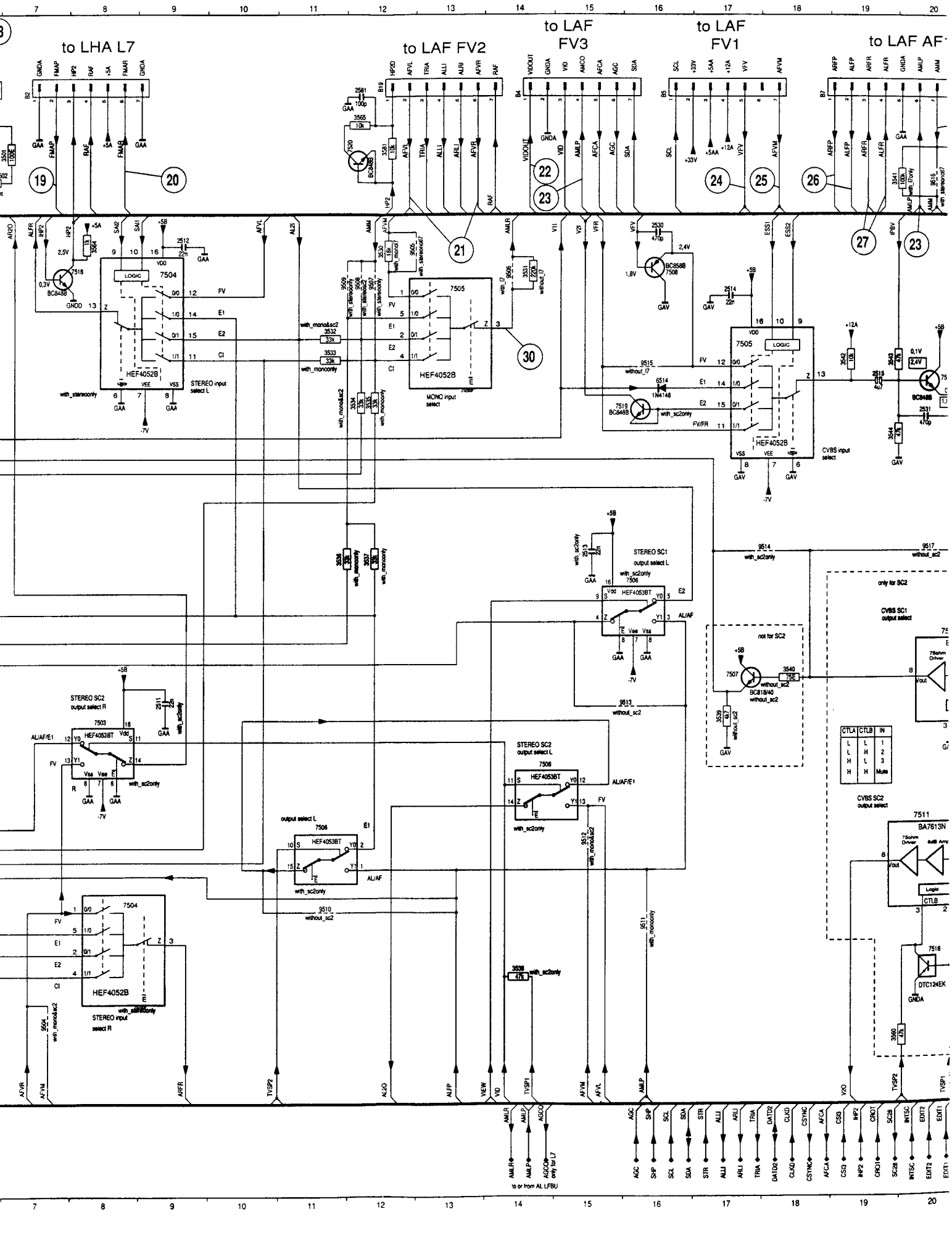
A: DC, 0.2 V/Div, 0.2 ms/Div

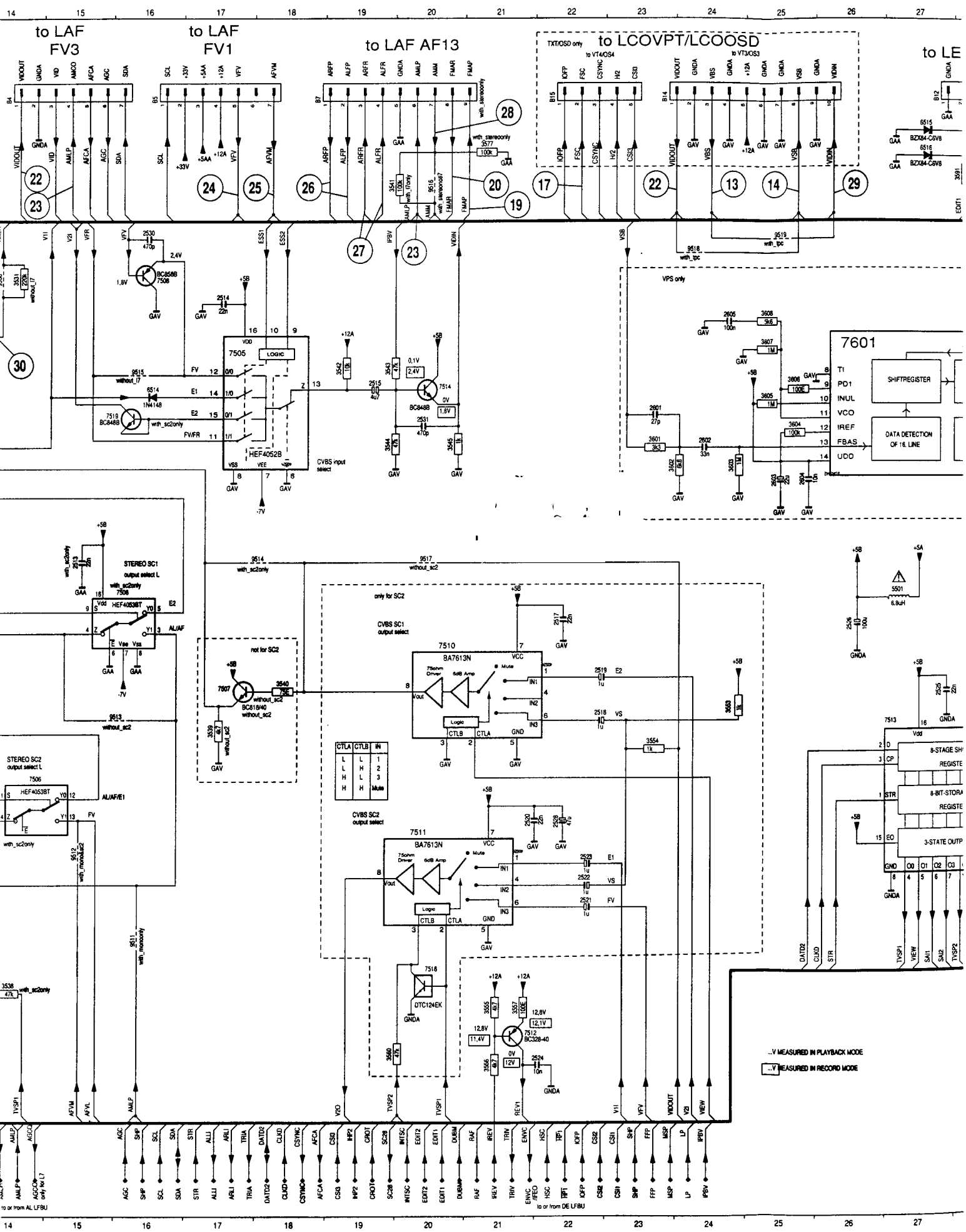


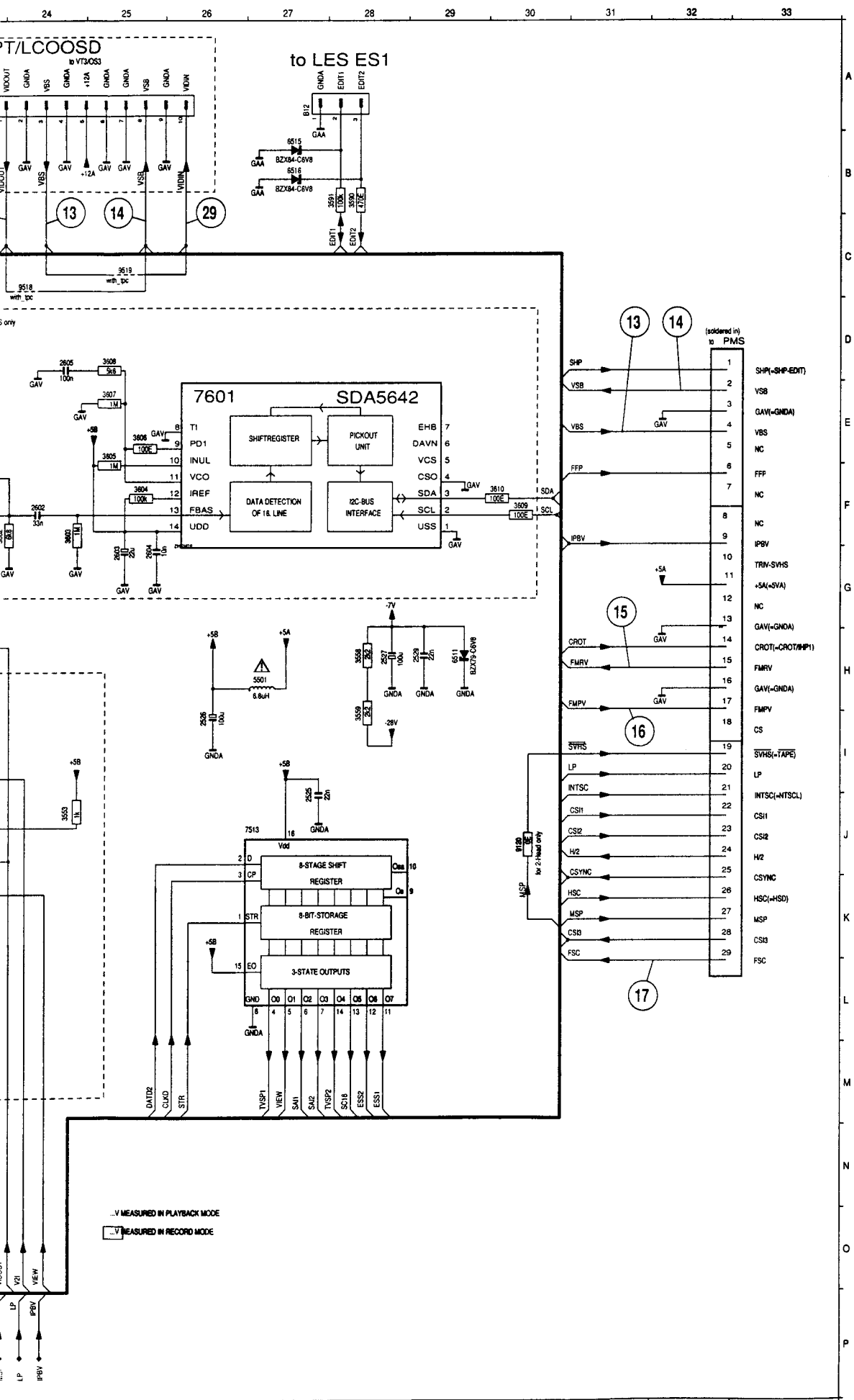
Osc 30
3/7505 AMLR

INPUT/ OUTPUT LFBU I-O



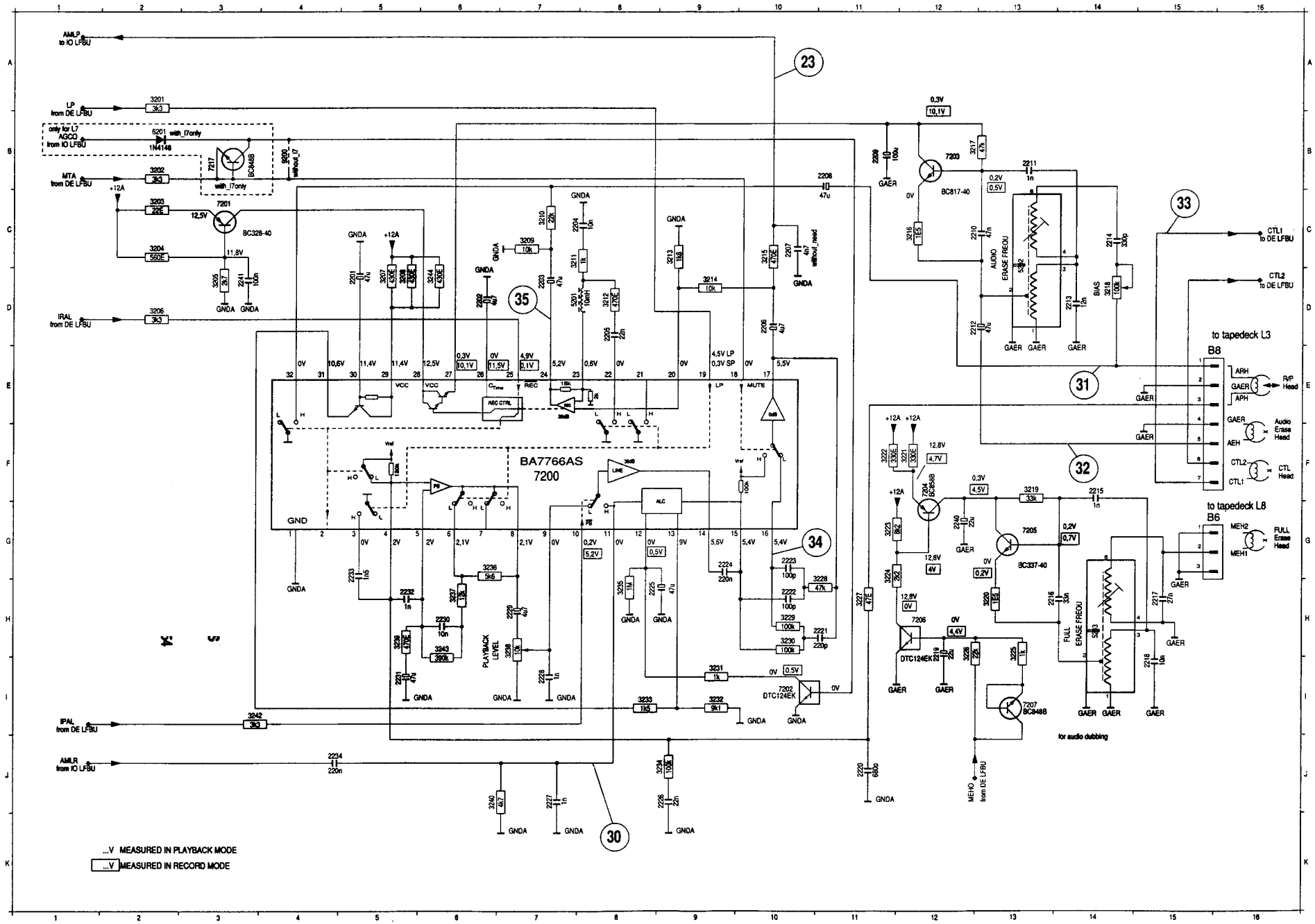

to LHA L7
to LAF FV2
to LAF FV3
to LAF FV1
to LAF AF
HEF4052B
HEF4053BT
BC848B
BC858B
BC818/40
DTC124EK
BA7613N
STEREO input select L
STEREO input select R
MONO input select
CVBS input select
STEREO SC1 output select L
STEREO SC2 output select L
STEREO SC2 output select R
CVBS SC1 output select
CVBS SC2 output select
only for SC2
not for SC2
to or from AL LFBU


to LAF FV3
to LAF FV1
to LAF AF13
TXT/OSD only
to LCOVPT/LCOOSD
to VT4/OS4
to VT3/OS3
to LE
7505
LOGIC
HEF4052B
CVBS input select
7601
SHIFTREGISTER
DATA DETECTION OF 16. LINE
PD1
INUL
VCO
IREF
FBAS
UDD
VPS only
STEREO SC1 output select L
STEREO SC2 output select L
HEF4053BT
CVBS SC1 output select
CVBS SC2 ouput select
7510
7511
BA7613N
not for SC2
only for SC2
DTC124EK
BC848B
BC818/40
BC858B
1N4148
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE



	2503 I2	7511 L20
	2504 J2	7512 N21
	2505 J2	7513 J26
	2506 K2	7514 E20
	2507 M2	7515 F6
A	2508 L2	7516 M20
	2509 N2	7517 D6
	2510 M2	7518 D8
	2511 J9	7519 F16
	2512 C9	7520 B12
	2513 H15	7601 E26
	2514 D17	9120 J30
	2515 E19	9501 K5
	2517 I22	9502 O5
	2518 J22	9503 N6
B	2519 I22	9504 N7
	2520 K21	9505 C12
	2521 L22	9506 D14
	2522 L22	9507 D12
	2523 L22	9508 D12
	2524 O22	9509 D11
	2525 J27	9510 M11
	2526 I26	9511 M16
C	2527 H28	9512 L15
	2528 K22	9513 J16
	2529 H29	9514 H18
	2530 C16	9515 E16
	2531 F20	9516 B20
	2581 A12	9517 H20
	2601 F23	9518 C24
	2602 F24	9519 C25
	2603 G25	9533 E4
D	2604 G25	B1 A4
	2605 D24	B12 A27
	3501 B7	B14 A23
	3502 B6	B15 A22
	3503 F3	B19 A12
	3504 F2	B2 A7
	3505 I3	B20 L1
	3506 I3	B21 F1
E	3507 I3	B3 A9
	3508 J3	B4 A14
	3509 J3	B5 A16
	3510 J3	B7 A18
	3511 H4	LSC2 A1
	3512 G5	LSE D32
	3513 H5	
	3514 G6	
F	3515 K3	
	3516 K3	
	3517 L3	
	3518 L3	
	3519 M3	
	3520 L3	
	3521 L3	
	3522 L3	
G	3523 N3	
	3524 N3	
	3525 M3	
	3526 M3	
	3527 B9	
	3528 B10	
	3529 B11	
	3530 C12	
	3531 D14	
H	3532 E11	
	3533 E11	
	3534 F12	
	3535 F12	
	3536 H11	
	3537 H12	
	3538 N14	
	3539 J17	
	3540 I18	
I	3541 B19	
	3542 E19	
	3543 E19	
	3544 F19	
	3545 F20	
	3546 E5	
	3547 E5	
	3548 E6	
J	3552 I4	
	3553 J24	
	3554 J23	
	3555 N21	
	3556 O21	
	3557 N21	
	3558 H28	
	3559 I28	
	3560 O19	
K	3561 B5	
	3562 G2	
	3563 C6	
	3564 C8	
	3565 B12	
	3577 B21	
	3581 B12	
	3590 B28	
L	3591 B28	
	3601 F23	
	3602 F23	
	3603 F24	
	3604 F25	
	3605 E25	
	3606 E25	
	3607 E25	
M	3608 D25	
	3609 F30	
	3610 F30	
	5501 H27	
	6501 F2	
	6502 I2	
	6503 J2	
	6504 I5	
	6505 H4	
N	6506 J2	
	6507 K2	
	6508 F4	
	6511 H29	
	6513 G2	
	6514 E16	
	6515 B27	
	6516 B27	
O	7501 G5	
	7502 H5	
	7503 J8	
	7503 M5	
	7503 J5	
	7504 D9	
	7504 M8	
	7505 E17	
	7505 D13	
	7506 H16	
P	7506 K14	
	7506 L11	
	7507 J17	
	7508 D16	
	7509 E5	
	7510 I20	

AUDIO LINEAR LFBU-AL



SETTINGS FOR THE LINEAR AUDIO PART LFBU-AL

1. Setting of the erasing frequency (5202)
- Connect frequency meter to resistor 3218
- Bring unit into mode "RECORD".
- Set the erasing frequency to 70 kHz ± 500 Hz with 5202

2. Setting of the bias current (BIAS) (3218)
- Connect millivoltmeter to 3227 (differential measurement)
- Bring unit into mode "RECORD"
- Set voltage at 3227 to 10 mV_{eff} ± 1 mV (70 kHz) with 3218.

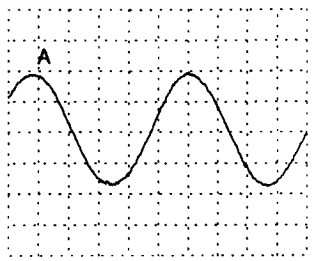
Checking the bias setting

After "BIAS" has been set with the indicated approximate value, make a music recording with linear audio alone. Use cassettes made by well-known manufacturers, but do not use chromium dioxide tape. When reproducing this recording, note whether the highs are sufficiently reproduced or whether the sound is not subject to distortion. If the share of the highs is not sufficient, the "BIAS" current must be reduced; if distortion is too great, it must be increased.

3. Playback - amplitude setting (3238)
- Record a signal (1 V_{eff}, 1 kHz)
- Connect a millivoltmeter to the cinch audio output
- Reproduce this recording with the output selection switched to linear audio
- Set the playback amplitude to 1 V_{eff} ± 1 dB with 3238

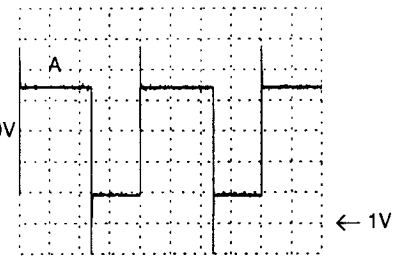
4. Adjustment of the full erase frequency (5203)
- Select the record mode
- Measure on the main erase head by means of a frequency meter
- Adjust 5203 for a frequency of 70 kHz ± 10 kHz

A: DC, 0.5 V/Div, 0.2 ms/Div



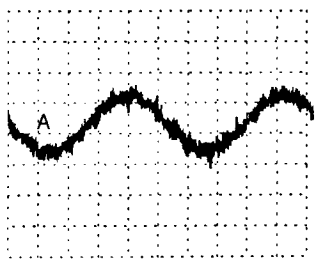
Osc 23
Capacitor 2207 AMLP

A: DC, 1 V/Div, 10 ms/Div



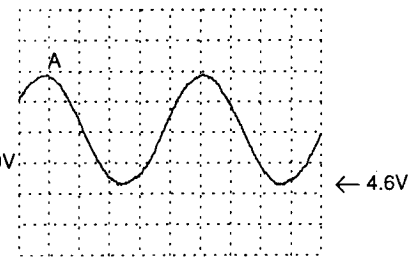
Osc 33
7B8 CTL1 REC

A: DC, 20mV/Div, 0.2 mV/Div



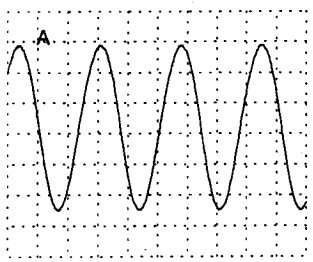
Osc 30
11/7200 AMLR

A: AC, 0.5 V/Div, 0.2 ms/Div



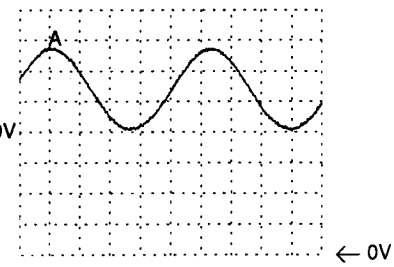
Osc 34
16/7200

A: DC, 10 V/Div, 5 us/Div



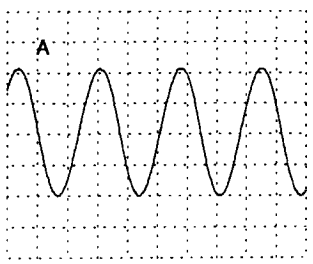
Osc 31
1B8 ARH Record

A: DC, 1 V/Div, 0.2 ms/Div

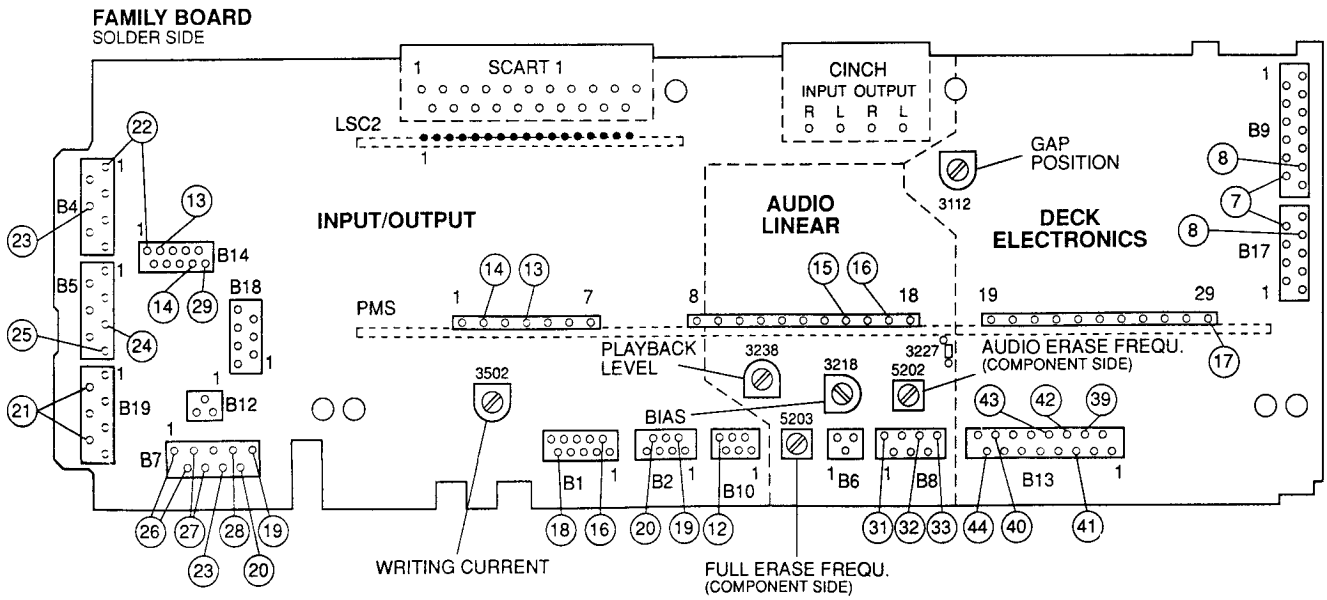


Osc 35
24/7200

A: DC, 5 V/Div, 5 us/Div



Osc 32
5B8 AEH Audio erase head



picture can be generated and inserted in the signal path by the signal processing IC (7501)

11. Evaluation of the tape drive switches

The turbo drive contains a maximum of three switches: INIT (Initialization switch), RECP (Record protection) and SVHS. The states of the three switches can be read into one of the analogue inputs of the IVC (Pin 56) with one single line (I/R/S). For this purpose, all switch outputs (their levels being either high or low) are interconnected via a resistor network (R3116, R3118, R3119).

12. Audio Mute MTA

The Mute Audio Signal (MTA) is output by the IVC-pin 29 (ALE). This pin cannot output a "H" level, but only the 2 MHz ALE. The ALE is fed via a low-pass R3169, C2127 and is then converted to a TTL compatible signal by means of the comparator 7102. The voltage divider R3157, R3158 (Vref appr. 0,7 V) serves as reference for the comparator.

13. The Capstan Switch Print LCS

An operating voltage selector for the Capstan motor is located on the LCS print, also the drive for the threading motor is located on this print. The connection to the LFBU is carried out via plug B13. The capstan motor supply is switch controlled to provide two possible output levels. The reason for the switching is to reduce power dissipation in the drive IC during the slower tape speeds. For slower speeds the capstan supply is changed from 14 V to approximately 8.5 V. The switching is controlled by the wind line. When the wind line is high the reference zener diode is active and the transistor (BD436) in series with the supply operates in regulator mode. The circuit functions as a regulator in the same way as the 12 V stabilizer (see chapter 9).

The capstan motor supply is short circuit protected. Reset is carried out after mains on/off by the 47 µF "Electrolytic start capacitor" between the base and the collector of the series regulator transistor.

SETTING FOR THE DECK ELECTRONICS LFBU-DE

1. Position setting (GAP position)

- Connect one input of an oscilloscope to connector 1B4 (video output)
- Connect the second input of the oscilloscope to pin 8B1 (HP1 pulse)
- Trigger oscilloscope to HP1
- Play test cassette 4822 397 30103
- Keep "PLAY" key depressed during setting procedure
- Set 3112 so that the positive slope of the HP1 signal is 416 µs ± 32 µs (6,5 ± 1/2 lines) in front of the front slope of the frame impulse (see Fig. 1)

A: AC, 0.5 V/Div, 0.1 ms/Div
B: AC, 2 V/Div, 0.1 ms/Div, TD = -8 Div

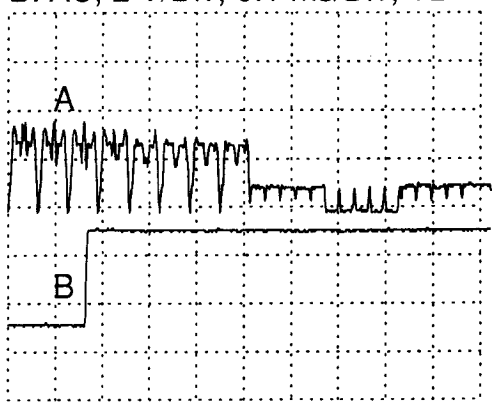


Fig. 1 Gap position

3-15

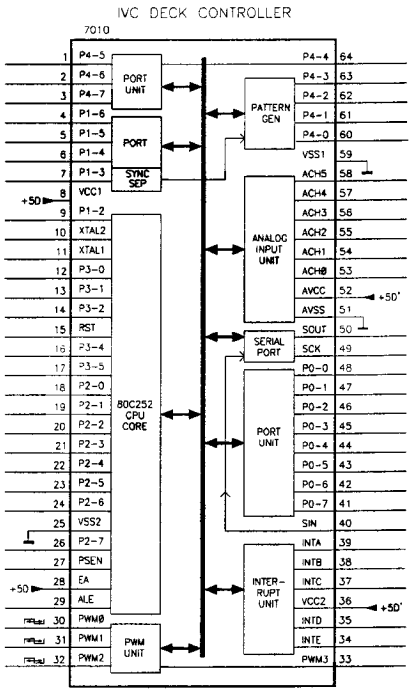
CIRCUIT DESCRIPTION OF THE DECK-ELECTRONICS LFBU-DE

1. IVC

8 analogue inputs are available. The input signals are fed to the A/DC via a multiplexer. The resolution of the converter is 8 bit. The maximum permissable input voltage range is 0...5V (defined by the reference voltages AVSS and AVCC).

Four analogue outputs are available each with a 8 bit resolution. These outputs supply a signal of constant frequency. (appr. 21,5 kHz) with variable pulse/interval ratio. It is possible to obtain a resolution of 14 bit by software. To achieve this resolution, two PWM outputs are internally linked. This means loss of one PWM output pin. The second output pin can then only be used as an ordinary circuit output.

The possibility of the increased resolution is used by the headwheel drive (REEL line).



2. SAA 1310 Deck mechanics interface

2.1 CTL-stage

The IC SAA 1310 contains a write/read stage for the CTL track, with the possibility of interference-free overwriting of an existing CTL track (e.g. if another index code (VISS or VASS) is to be written on the tape).

The playback stage is equipped with a "digital", two-stage AGC. By comparators, this circuit logic identifies the size of the output signal supplied by the CTL head and then selects the best amplifier gain in the playback stage.

Note: The playback signal from the head follows the law of induction (dΦ/dt) and is therefore largely - with the exception of the gap function - proportional to the tape speed. The CTL head voltage can therefore vary considerably from vmax when FAST SEARCH (index search) is used to vmin when the LP mode which has the slowest tape speed. The highest speed sets in with FAST WIND or FAST SEARCH (Index search).

To ensure that under the above mentioned conditions the pulse/interval ratio of the tape sync is always correctly reproduced (it is important for the distinction of 1 and 0 for VISS or VASS marks), the amplifier must not be overdriven. The two-stage AGC alone cannot process the large dynamic range of the input voltage. The amplifier is therefore provided with an internal low pass feature (fg = 3 Khz typ.) and also the amplification is further reduced for all winding modes by means of transitor 7104.

In this case, the signal WIND = low and T7104 is disabled. The transistor is deliberately polarity inverted, as the inverse operation has the better damping qualities for this application. If T7104 is disabled, the amplifier's feedback network, as well as the external resistor 3121 is also disabled. Alternative short-circuit of R3121 with T7104 permits to reduce the amplification in the proportion

g on / g off = 1 + R3121 / 100

In parallel to the CTL head, there is the R.C. circuit of C2106 (4n7) and R3123 (10k). Together with the CTL head inductance, the capacitor causes a resonance step-up at approx. 8 kHz. The R3123 causes a steep fall of the frequency transmission characteristic beyond resonance, providing an effective suppression of high-frequency stray pickup.

The CTL head signal amplitude in SP is approx. 1...2 mVpp. Therefore the gain of the playback amplifier has to be suitably high. To avoid offset problems, a 47 µF electroytic capacitor is built into the negative feedback branch for DC decoupling. Together with the internal 100 Ω feedback resistor, this electrolytic capacitor causes a high-pass behaviour. It must be of sufficient capacity to ensure that the differentiating effect is beyond a cut-off frequency, where the distortions of the signal shapes at the lowest tape speed rates remain negligible. Otherwise overshoots occur after each change of magnetisation on the tape, resulting in faulty triggering of the internal logic and therefore in faulty sync signals.

The polarity of the playback amplifier can be reversed with the Capstan-Reverse (CREV) voltage. This enables the IVC always to see the correct sync edge independent of the tape feed direction.

The W/R (Write/Read) signal is used to change between record and playback. W = high and R = low.

The SYNC line (pin 16) is a bidirectional line. In the case of write, a square-wave signal of 40 ms period is output by the IVC. The recording amplifier in the SAA 1310 converts this voltage into a square-wave recording current of approx. +/-2mA.

Pin 3 of the SAA 1310 is the buffered output of the IC internal reference (2,5V +/- 0,1V).

2.2 POR (Power On Reset) - Generator

The POR generator contained in the SAA 1310 requires only one external component. This is the capacitor 2108 which defines the length of the POR pulse. At 33 nF, t por is approx. 30 ms.

As generally the IVC ports (with the exception of PWM) emit "H" levels during POR, the REV (record Video) line is kept "L" during the POR pulse by means of transistor T7107. This avoids erased spots on the tape due to power failure while the tape is threaded.

2.3 The sensor interface

The four comparators in the SAA 1310 are used to convert sensor signals to logic levels. Two of these comparators have open collector outputs (pin 11 and 10), which can source a current of 100 mA. The outputs are overload protected by a current limiter and thermal shutdown.

Only the non-inverting input of each comparator is accessible from the outside. The other inputs are connected to the internal reference voltage of nom. 2,5 V. Also the hysteresis of the comparators of approx. 10 mV is set internally.
The following sensors are evalutated:
FTA threading tachometer. This signal comes from a forked light barrier in the deck. An infra-red light beam is interrupted by a four-blade impeller (butterfly). The output amplitude of the sensor has to have a minimum variation of between 2V and 3V to ensure correct evaluation. By means of R3140 and R3141, an additional hysteresis is obtained.

WTR/WTL (Winding tachometer right/left) comes from reflected light beams. The minimum output requirement is the same as the FTA.

FG = Capstan tachometer. This signal comes from the sensor print on the turbo drive via the pre-amplifier of the tacho-HALL sensor in the motor unit.

The amplitude of the almost sine-shaped signal is typ. 1 Vpp. The minimum acceptable level is 300mVpp. The signal is AC-coupled via C2109. Therefore the input at pin 8 is connected to the reference voltage at pin 3 via the resistor 3126. The capacitor C2107 in parallel with 3126 is to remove HF noise.

3. Interface to the headwheel motor driver

The connection to the HMO driver IC on the WHA print is via plug B10. The speed regulating signal is REEL, the resolution is 14 bit. PG/FG is the combined POS/tachometer signal of TDA5140 (HMO driver).

TRIV (Tracking Information Video) is the envelope information from the head amplifier.

Via input multiplexer IC7020, it goes into one of the analogue inputs of the IVC. The current drawn from the +14M2 under ambient temperature conditions is typ. 70mA. During the run-up period of the motor approx. 0.5 A flow for a short time.

4. Interface to the Capstan motor

4.1 Motor driver interface:

The Capstan motor in the turbo drive is driven via plug B13. CAP is the Capstan speed signal, which can vary without load between 0 and 5V. By means of CREV (Capstan reverse) the direction of the motor rotation is changed. The signal is fed via a diode to the motor driver, thus effectively preventing latch-up (otherwise the current limiting will fail).

The maximum current consumption of the motor is limited to 1 A. Typical values in PLAY mode are 0,2 ...0,3 A.

4.2 Tachometer preamplifier

The Tachometer preamplifier is located on the sensor print. It is a DC coupled differential amplifier using discrete components. AC and DC amplification are different to avoid problems with the offset of the Hall element.

5. Threading motor driver

The TMO driver is provided in bridge circuit using a dual power opamp. L2722. This IC can supply an output current of +/-1A. It has diode protection (fly-back diodes) at the outputs.

Between the IC outputs (Pin 1 and 3) there is a Boucherot element (1 Ω, 100 nF) to suppress a 3 MHz spurious oscillation from the power amplifier. One half of the bridge is controlled via the TMO line and functions as comparator. The other half is an amplifier-integrator with gain 3.9 times. A variation of the input voltage (THIO) between 0 and 5V causes a voltage variation at the output between 0V and nearly supply voltage. In case of a 50% modulation (THIO = 2,5V), there is approx. 7V at PIN3. The integration with C2102 serves to filter out the PWM frequency of approx. 21,5 Hz.

The polarity of the comparator (noninvert.) and of the opamp (invert.) is selected as follows: In the event of a Power-On Reset, the IVC takes the THIO line "L", whereas TMO is "H". The above polarity must be observed to ensure that no current is applied to the motor during the POR pulse period. To avoid the adverse conditions that would be applied to the motor in the event of the loss of the 5V supply a separate reference divider is provided for the comparator section. Both outputs of the L2722 are now "common-mode" in the event of the above mentioned failure.

6. Tape end - LED - control

The LED current is controlled by transistor 7113. The ON time is approx. 1 ms. with an ON/OFF ratio of 0,09.C2116 slightly attenuates the slopes to avoid interference in the signal electronics. The LED current is at least 75 mA and supplied by the +14M1.

7. V/H sync - change-over

The IVC internal sync separator requires composite syncs in when the signal is 100% standard and fails when they come i.e. from another VCR. Therefore the circuit around IC7102 and T7112 forms a sync separator with a two stage low pass filter consisting of R3155, C2121 and R3156, C2122. The transistor is controlled by the IVC via the line SEL_V/H. When the line is High the transistor is on and provides an earth return for the two capacitors, placing the two stage low pass filter in series with the composite sync feed to 7102. The filter removes the line syncs and 7102 converts the signal to TTL level. When SEL_V/H is low the composite sync is passed to the IVC

8. Stabilization for the 12A supply

The output voltage is specified with 12 V + 1.0/0.6V for a maximum load current of 400 mA. To ensure an uniform current division between the two series pass transistors BD436 (T7110, T7111) connected in parallel, a 6.8 Ω resistor is connected in series with each emitter. This reduces the effect of tolerances and temperature drift on the base emitter voltages. The circuit is short circuit protected, after a short circuit of the output voltage, reset has to be carried out by temporarily removing the mains plug. In this case, the electrolytic capacitor 2117 charges to start the circuit.

9. Digital Sharpness Control

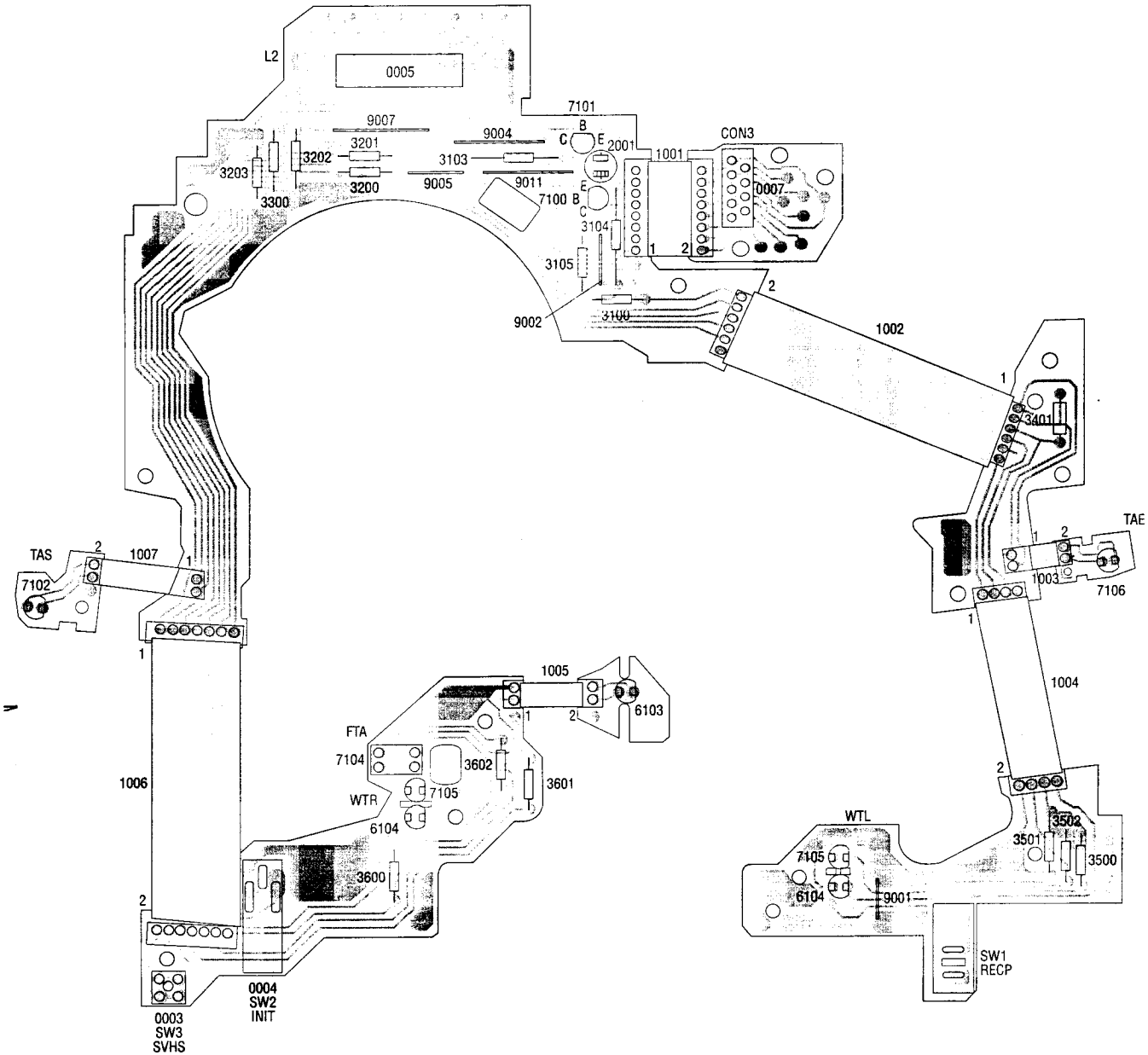
Pin 41 of the IVC outputs a signal (SHPD) which has a six position variable duty cycle. After the mean value of the signal has been obtained using a two section low-pass filter (R3166, C2124, R3167, C2125) it is passed to the IO as sharpness control signal (SHP). The SHPD frequency is approx. 300 Hz.

10. Test picture generation for non VPT/OSD equipment

By means of the resistor network R3162, R3163, R3164, R3165 and the corresponding selection of lines IOFP and FFP by the IVC, the levels (Sync, black, white) for a test

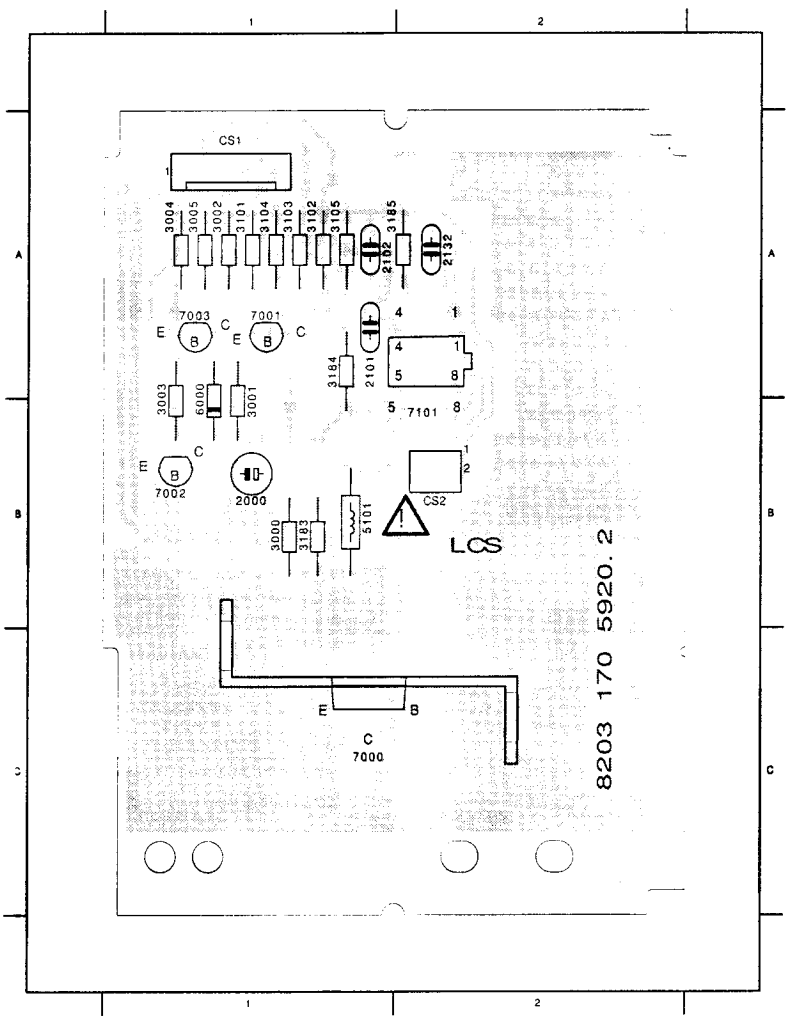
3-16

TAPE DECK SENSOR PANEL

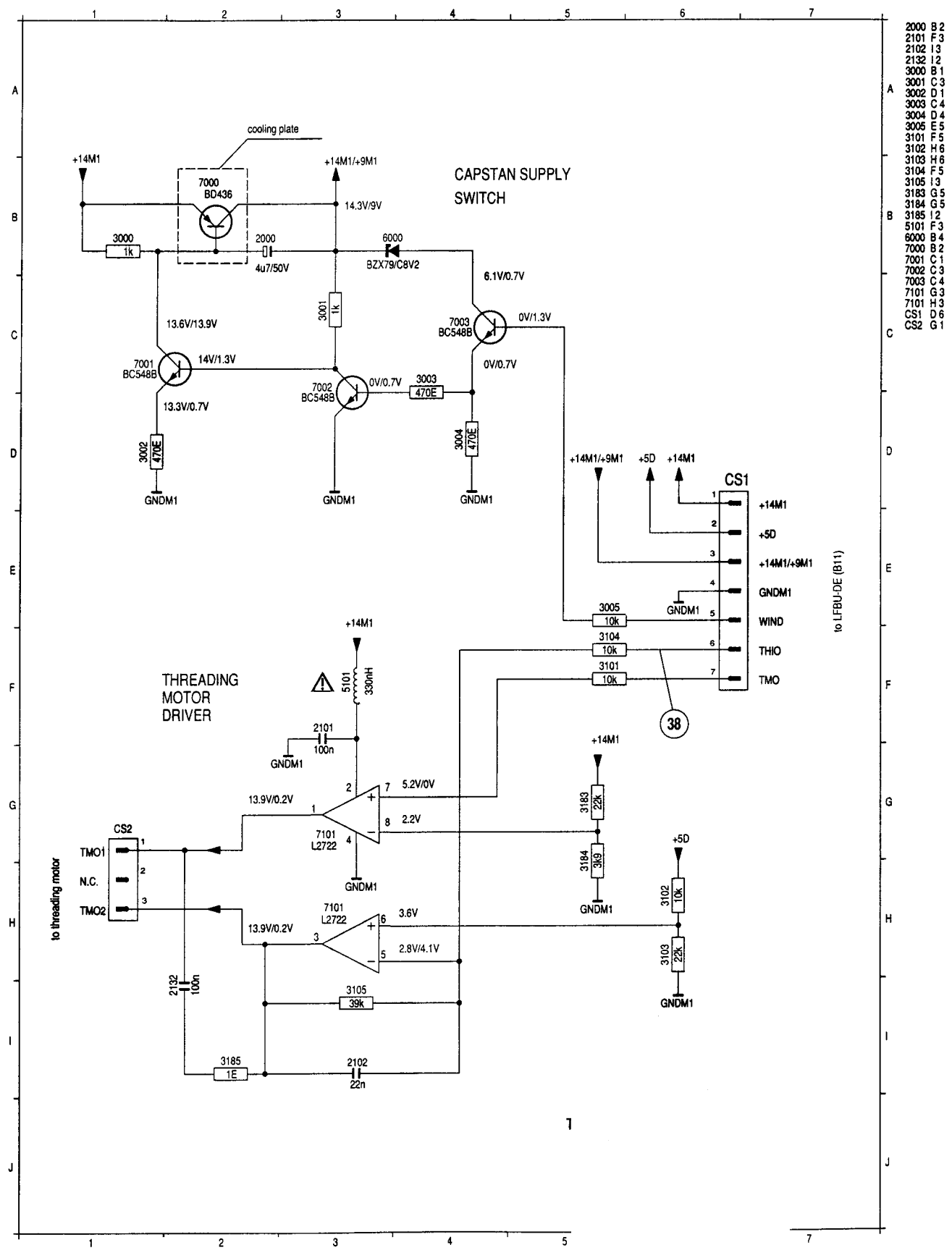


CAPSTAN SWITCH LCS

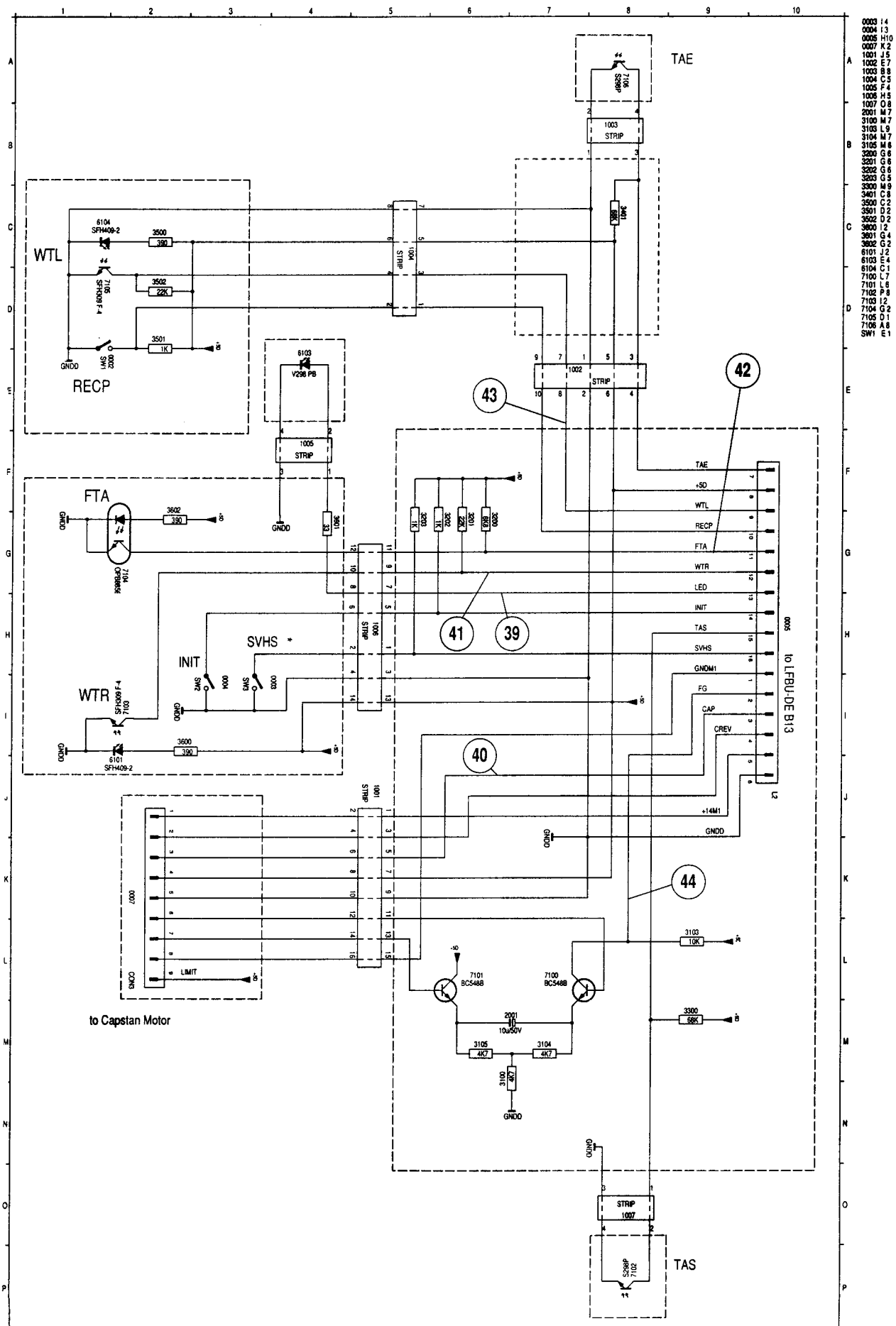
2000 B 1	2132 A 2	3002 A 1	3005 A 1	3103 A 1	3183 B 1	5101 B 1	7001 A 1	7101 A 2
2101 A 1	3000 B 1	3003 B 1	3101 A 1	3104 A 1	3184 A 1	6000 A 1	7002 B 1	CS1 A 1
2102 A 1	3001 B 1	3004 A 1	3102 A 1	3105 A 1	3185 A 2	7000 C 1	7003 A 1	CS2 B 2



CAPSTAN SWITCH LCS

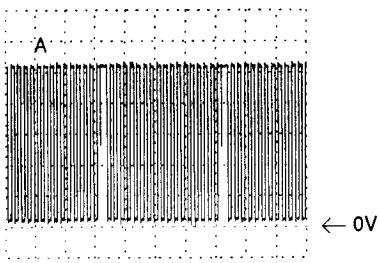


TAPE DECK SENSOR PANEL



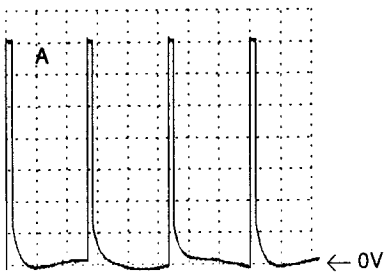
DECK ELECTRONICS LFBU-DE

A: DC, 1 V/Div, 10 ms/Div



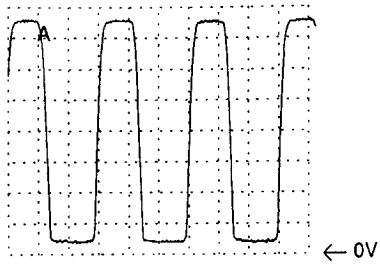
Osc 12
6B10 PG/FG

A: DC, 0.5 V/Div, 5 ms/Div



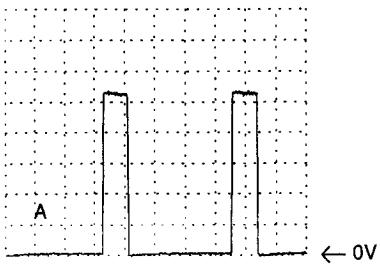
Osc 39
4B13 LED

A: DC, 0.5 V/Div, 2 ms/Div



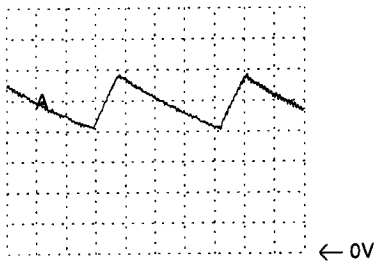
Osc 43
8B13 WTL Wind

A: DC, 1 V/Div, 10 us/Div



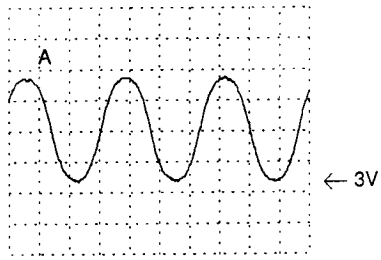
Osc 36
30/7010 CAP

A: DC, 0.2 V/Div, 10 us/Div



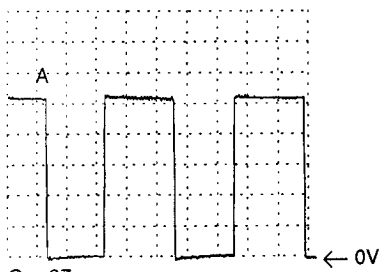
Osc 40
14B13 CAP

A: AC, 0.5 V/Div, 0.2 ms/Div



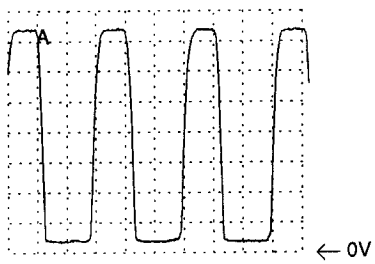
Osc 44
15B13 FG

A: DC, 1 V/Div, 10 us/Div



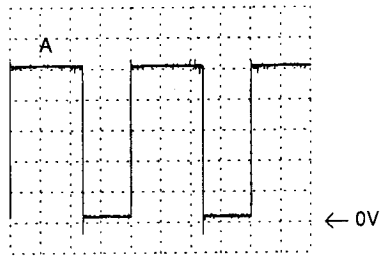
Osc 37
31/7010 REEL

A: DC, 0.5 V/Div, 2 ms/Div



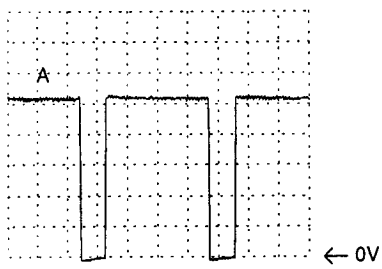
Osc 41
5B13 WTR Wind

A: DC, 1 V/Div, 10 ms/Div



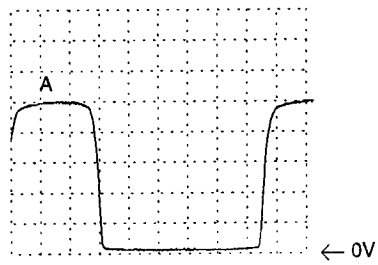
Osc 45
2/7105 CTL1 REC

A: DC, 1 V/Div, 10 us/Div



Osc 38
32/7010 THIO

A: DC, 1 V/Div, 2 ms/Div



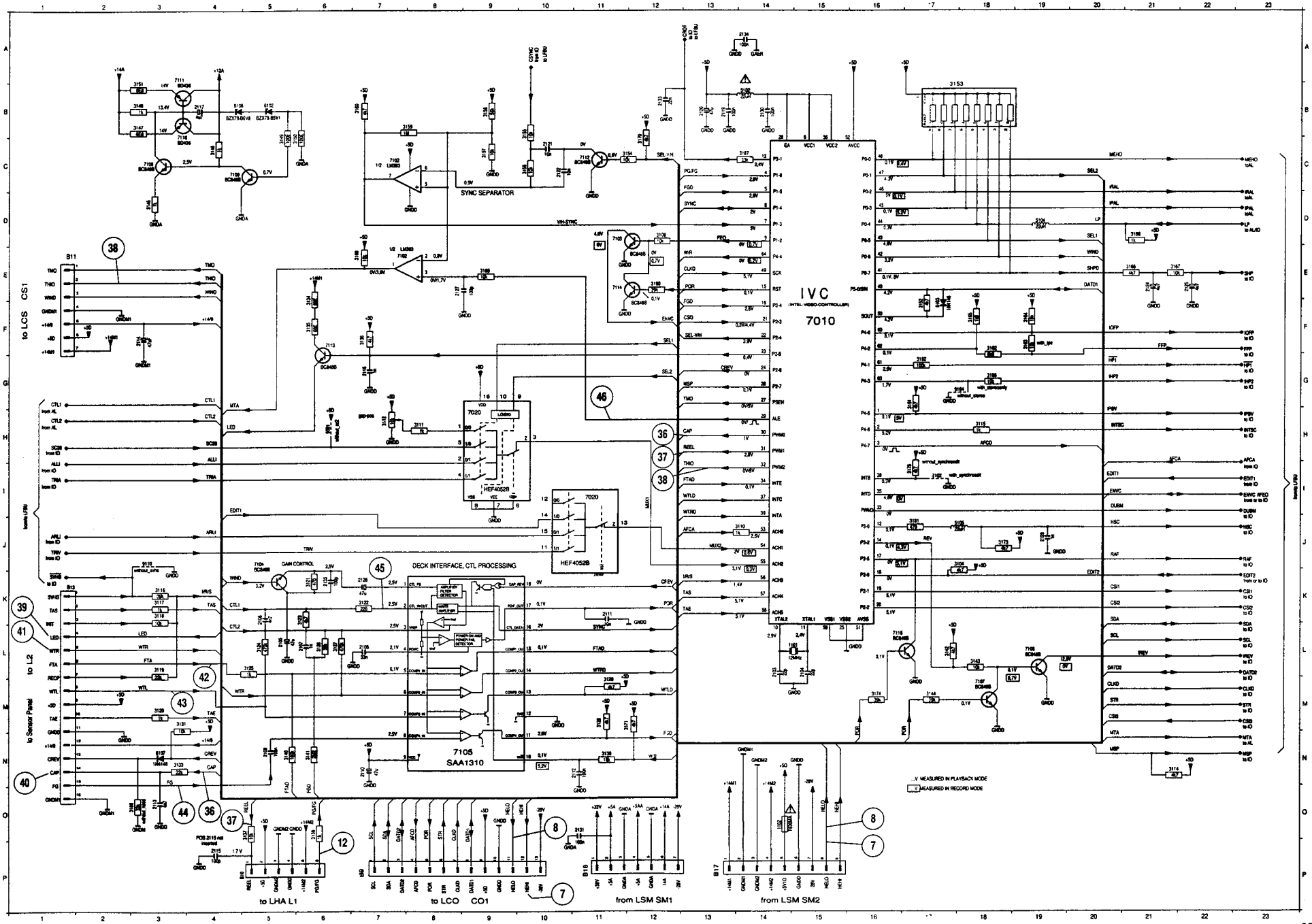
Osc 42
6B13 FTA Threading

A: DC, 1 V/Div, 0.2 us/Div

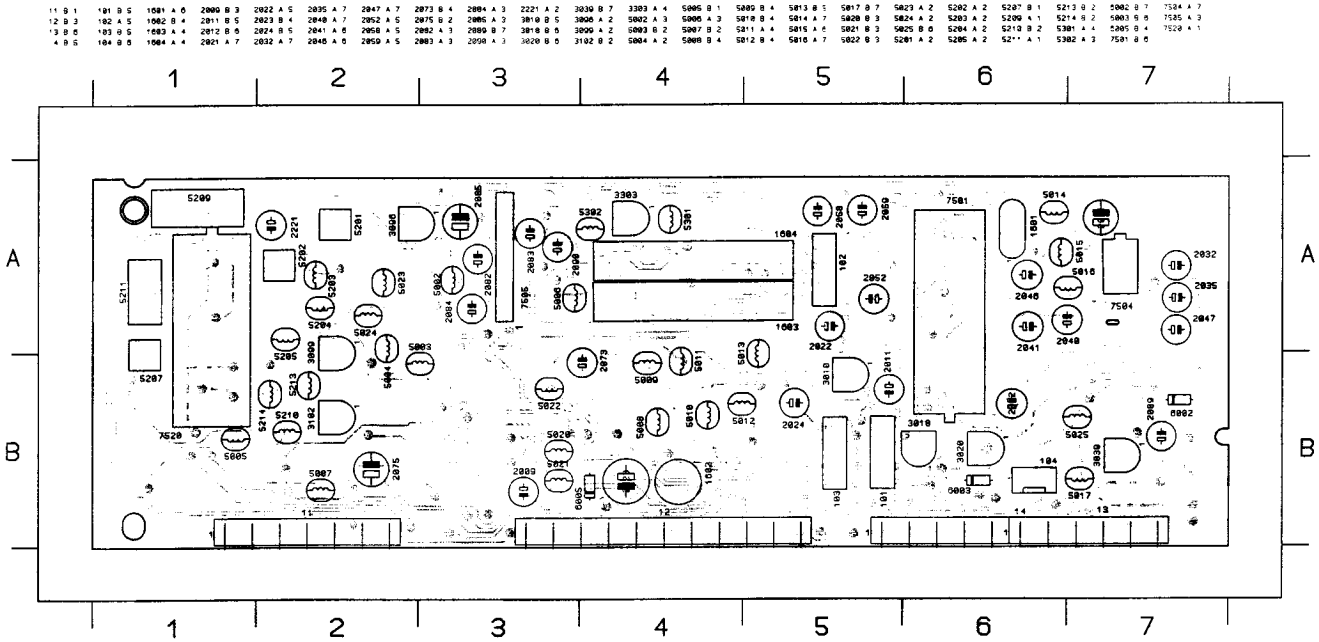
Osc 46
29/7010 MTA active

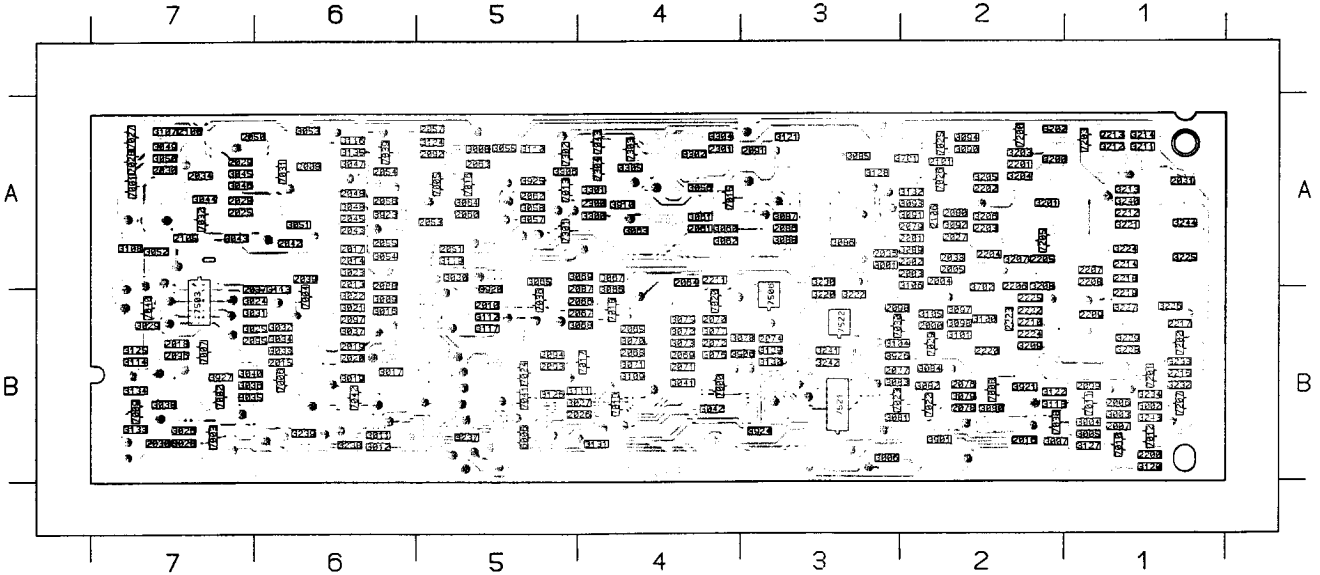
3-19

DECK ELECTRONICS LFBU-DE

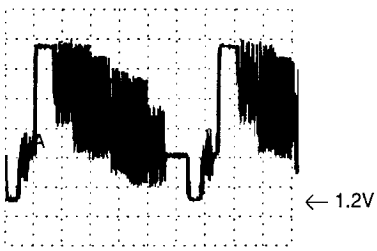


CS 37033



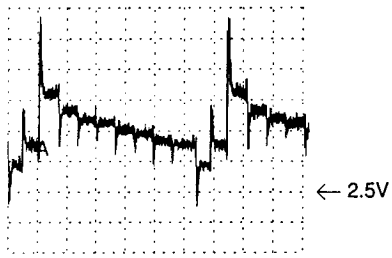


A: AC, 0.2 V/Div, 10 us/Div



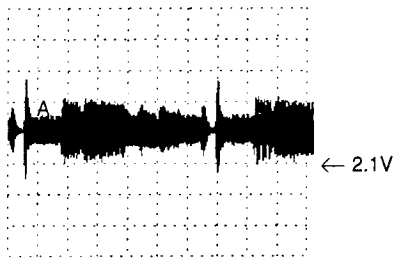
Osc 13
Connector 4/11 VBS

A: AC, 0.2 V/Div, 10 us/Div



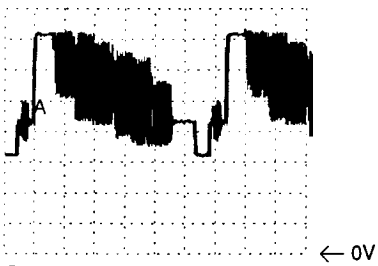
Osc 47
5/7501

A: AC, 0.2 V/Div, 10 us/Div



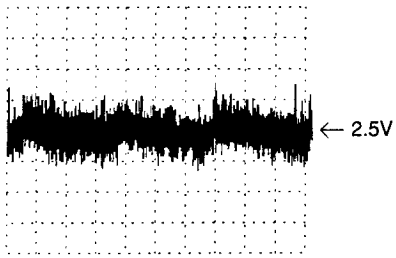
Osc 52
15/7520 CHRS

A: DC, 0.5 V/Div, 10 us/Div



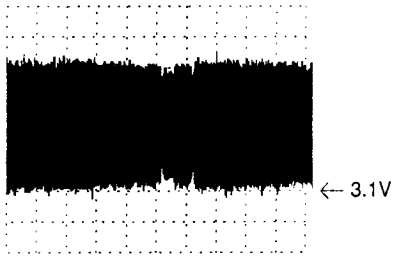
Osc 14
Connector 2/11 VSB

A: AC, 20 mV/Div, 20 us/Div



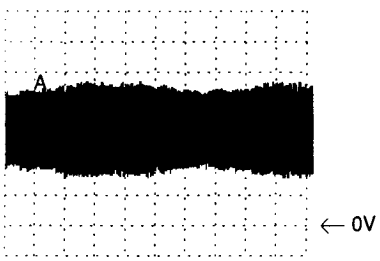
Osc 48
42/7501

A: AC, 0.1 V/Div, 10 us/Div



Osc 53
39/7501

A: DC, 0.2 V/Div, 10 us/Div

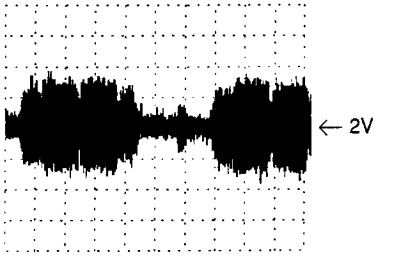


Osc 15
Connector 8/12 FMRV

A: AC, 0.2 V/Div, 10 us/Div

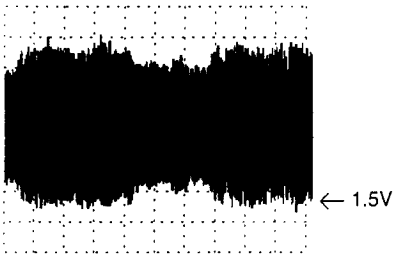
Osc 49
40/7501

A: AC, 50 mV/Div, 10 us/Div



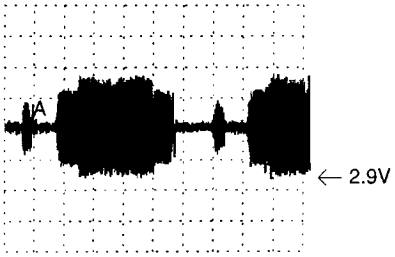
Osc 54
27/7501

A: AC, 50 mV/Div, 10 us/Div



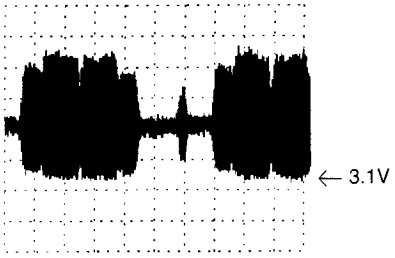
Osc 16
Connector 10/12 FMPV

A: AC, 0.1 V/Div, 10 us/Div



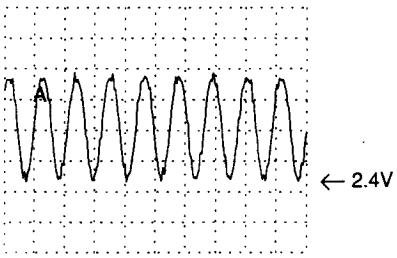
Osc 50
15/7501

A: AC, 0.1 V/Div, 10 us/Div



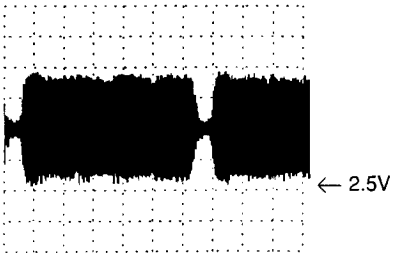
Osc 55
29/7501

A: AC, 0.2 V/Div, 0.2 us/Div



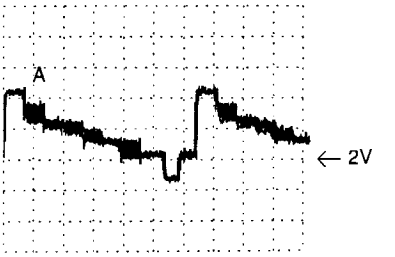
Osc 17
Connector 11/14 FSC

A: AC, 50 mV/Div, 10 us/Div



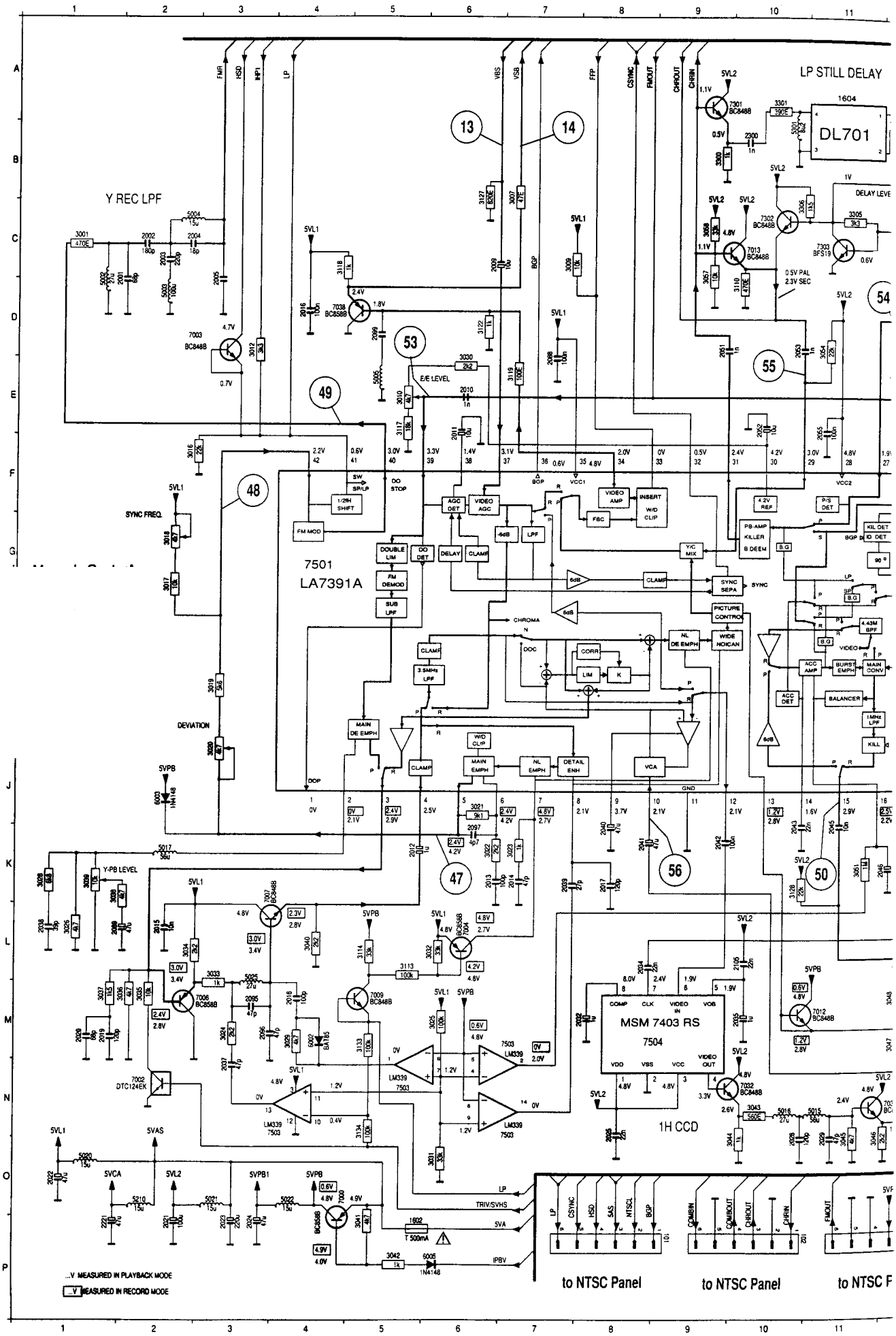
Osc 51
25/7520

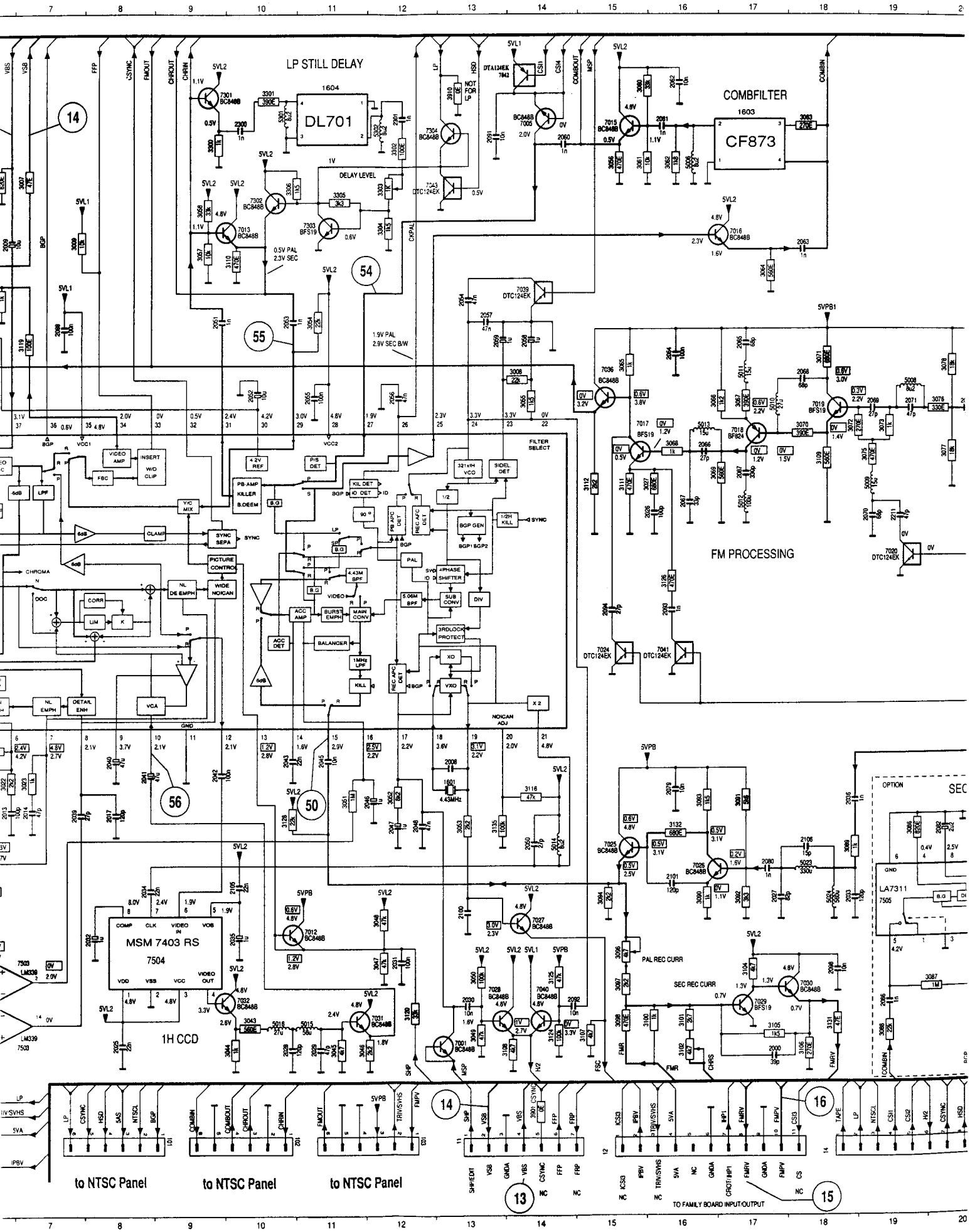
A: AC, 0.2 V/Div, 10 us/Div

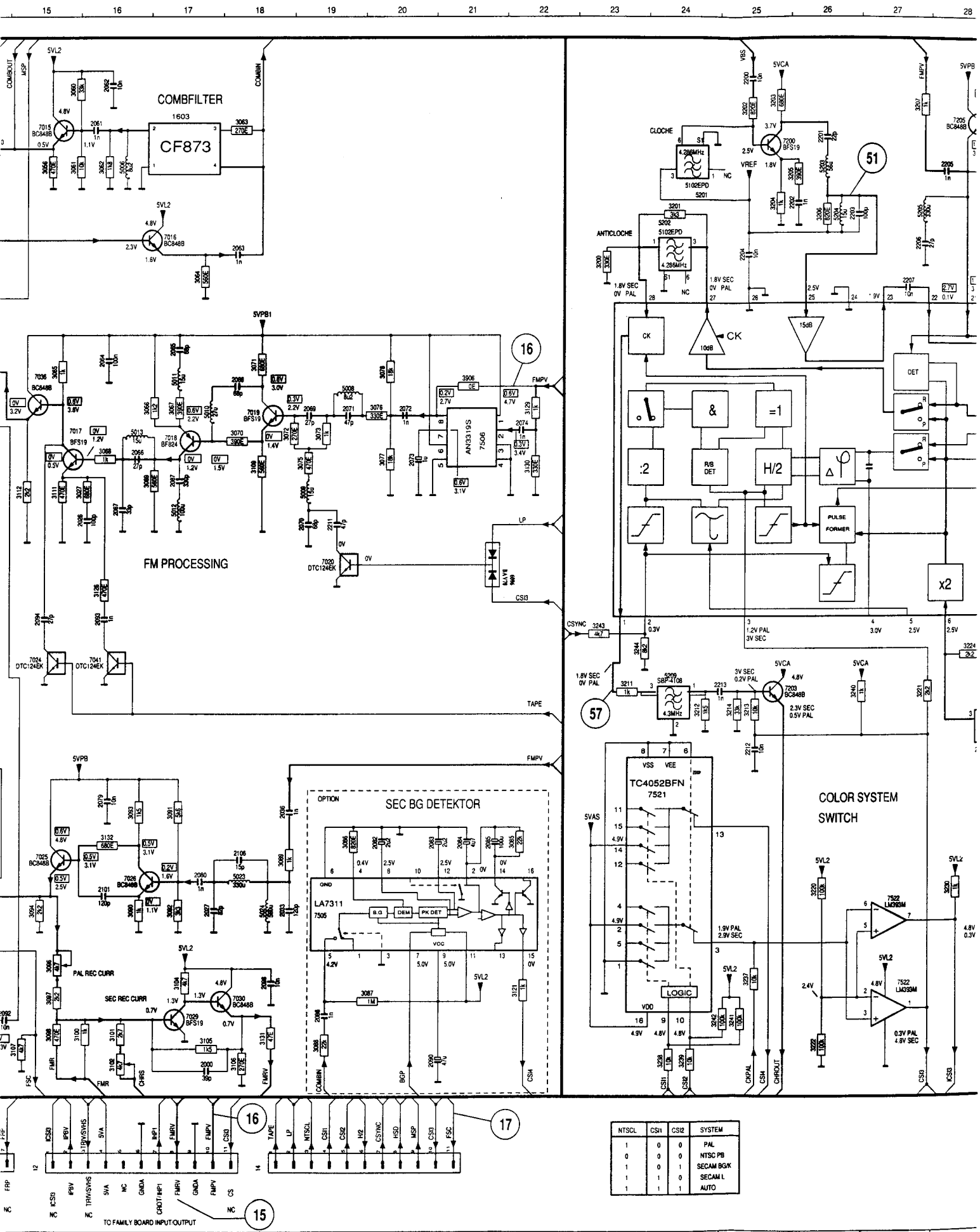


Osc 56
10/7501 RECORD

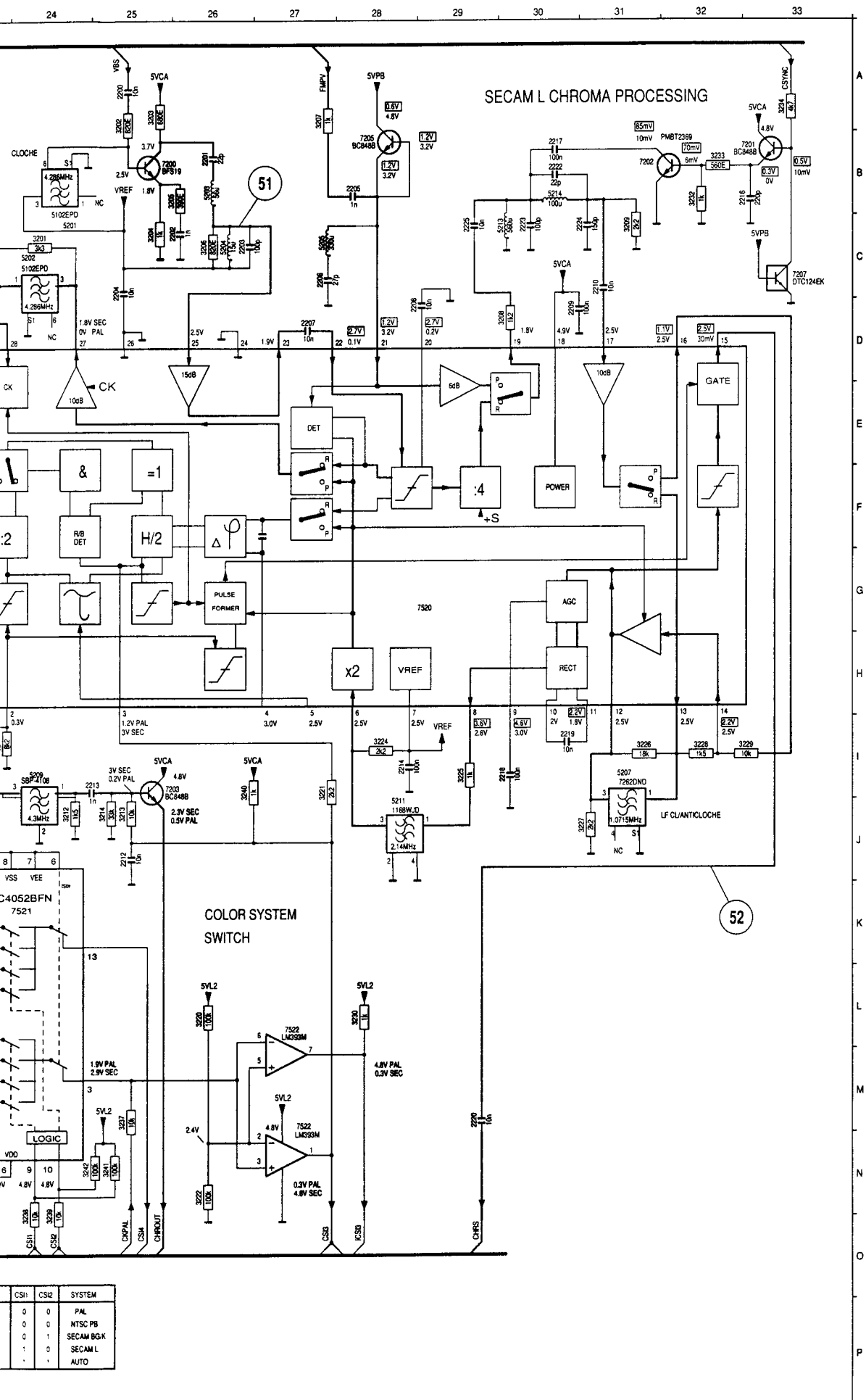
SIGNAL ELECTRONICS PMS




LP STILL DELAY
DL701
COMBFILTER
CF873
DELAY LEVEL
0.5V PAL
2.3V SEC
1.9V PAL
2.9V SEC B/W
FM PROCESSING
FILTER SELECT
MSM 7403 RS
7504
1H CCD
PAL REC CURR
SEC REC CURR
LA7311
to NTSC Panel
to NTSC Panel
to NTSC Panel
TO FAMILY BOARD INPUT/OUTPUT



NTSCL	CSI1	CSI2	SYSTEM
1	0	0	PAL
0	0	0	NTSC PB
1	0	1	SECAM BG/K
1	1	0	SECAM L
1	1	1	AUTO



	101 P 9	3017 G 2	3244 I23				
	102 P10	3018 G 2	3300 B 9				
	103 P12	3019 I 3	3301 A10				
	11 P13	3020 J 3	3302 B12				
	12 P15	3021 J 6	3303 C12				
A	14 P18	3022 K 6	3304 C12				
	1601 K13	3023 K 7	3305 C11				
	1602 P 5	3024 M 3	3306 C10				
	1603 A17	3025 M 6	3901 O14				
	1604 A11	3026 L 1	3906 E21				
	2000 O17	3027 G16	3910 A13				
	2001 D 1	3028 K 1	5002 D 1				
	2002 C 2	3029 M 4	5003 D 2				
	2003 C 2	3030 E 6	5004 C 2				
	2004 C 2	3031 O 6	5005 E 5				
B	2005 D 3	3032 L 6	5006 B16				
	2008 K13	3033 L 3	5008 E19				
	2009 C 6	3034 L 2	5009 G19				
	2010 E 6	3035 M 2	5010 F17				
	2011 E 6	3036 M 2	5011 E17				
	2012 K 5	3037 M 1	5012 G17				
	2013 K 6	3038 K 1	5013 F16				
	2014 K 7	3039 K 1	5014 L14				
C	2015 L 2	3040 L 4	5015 N11				
	2016 D 4	3041 P 5	5016 N10				
	2017 K 8	3042 P 5	5017 K 2				
	2018 M 4	3043 N10	5020 O 1				
	2019 M 1	3044 O10	5021 O 3				
	2020 M 1	3045 O11	5022 O 4				
	2021 P 2	3046 O11	5023 L18				
	2022 O 1	3047 M12	5024 L18				
D	2023 P 3	3048 M12	5025 L 3				
	2024 P 3	3049 N13	5201 C24				
	2025 N 8	3050 N13	5202 C24				
	2026 G16	3051 K11	5203 B26				
	2027 L17	3052 K12	5204 C26				
	2028 O10	3053 K13	5205 C27				
	2029 O11	3054 D11	5207 I31				
	2030 N13	3055 F14	5209 I24				
	2031 M12	3056 B15	5210 O 2				
E	2032 M 8	3057 C 9	5211 J28				
	2033 L18	3058 C 9	5213 C30				
	2034 L 8	3060 A15	5214 B30				
	2035 M10	3061 B15	5301 B10				
	2036 K18	3062 B16	5302 B12				
	2037 N 3	3063 B18	6002 M 4				
	2038 L 1	3064 D17	6003 J 2				
	2039 K 7	3065 E15	6005 P 6				
F	2040 K 8	3066 F16	6006 H22				
	2041 K 8	3067 F17	7000 O 4				
	2042 K 9	3068 F16	7001 N13				
	2043 K10	3069 G16	7002 N 2				
	2045 K11	3070 F18	7003 D 2				
	2046 K12	3071 E18	7004 L 6				
	2047 K12	3072 F18	7005 B14				
	2048 K12	3073 F19	7006 M 3				
	2050 L14	3075 F19	7007 L 3				
G	2051 D 9	3076 F20	7009 M 5				
	2052 E10	3077 F20	7012 M11				
	2053 D10	3078 E20	7013 C10				
	2054 D13	3085 K22	7015 B15				
	2055 E11	3086 K19	7016 C17				
	2056 E12	3087 N20	7017 F16				
	2057 D13	3088 N19	7018 F17				
	2058 E14	3089 L18	7019 F18				
H	2059 E13	3090 L16	7020 H19				
	2060 B14	3091 K17	7024 I15				
	2061 B16	3092 L17	7025 L15				
	2062 A16	3093 K16	7026 L16				
	2063 C18	3094 L15	7027 M14				
	2064 E16	3096 M15	7028 N13				
	2065 E17	3097 N15	7029 N17				
	2066 F16	3098 N15	7030 N18				
	2067 G16	3100 N16	7031 N12				
I	2068 E18	3101 N16	7032 N10				
	2069 F19	3102 O16	7036 E15				
	2070 G19	3104 M17	7038 D 4				
	2071 F19	3105 N17	7039 D14				
	2072 F20	3106 O18	7040 N14				
	2073 F20	3107 N15	7041 I16				
	2074 F22	3108 O14	7042 A14				
	2079 K16	3109 F18	7043 C13				
J	2080 L17	3110 D10	7200 B25				
	2082 K20	3111 G15	7201 B33				
	2083 K20	3112 G15	7202 B31				
	2084 K21	3113 L 5	7203 I25				
	2085 K21	3114 L 5	7205 B28				
	2086 N19	3116 K14	7207 C33				
	2087 G17	3117 E 5	7301 A 9				
	2088 E 7	3118 C 4	7302 C10				
	2089 L 1	3119 E 7	7303 C11				
K	2090 N20	3120 N12	7304 B13				
	2091 B13	3121 N22	7501 G 4				
	2092 N14	3122 D 6	7503 N 4				
	2093 H16	3124 N14	7503 N 5				
	2094 H15	3125 N14	7503 M 7				
	2095 M 3	3126 H16	7503 N 7				
	2096 M 3	3127 B 6	7504 M 8				
	2097 K 6	3128 K10	7505 M19				
L	2098 M18	3129 F22	7506 F21				
	2099 D 5	3130 F22	7520 G28				
	2100 M13	3131 N18	7521 K23				
	2101 L16	3132 K16	7522 M27				
	2105 L10	3133 M 5	7522 L27				
	2106 L18	3134 N 5					
	2200 A25	3135 K13					
	2201 B26	3200 D23					
M	2202 C26	3201 C24					
	2203 C26	3202 A25					
	2204 C25	3203 A25					
	2205 B28	3204 C25					
	2206 C27	3205 B26					
	2207 D27	3206 C26					
	2208 D28	3207 A27					
	2209 D30	3208 D30					
	2210 C31	3209 C31					
N	2211 G19	3211 I23					
	2212 J25	3212 J24					
	2213 I25	3213 J25					
	2214 I28	3214 J25					
	2216 B33	3220 L26					
	2217 B30	3221 I27					
	2218 I30	3222 N26					
	2219 I30	3224 I28					
O	2220 M29	3225 I29					
	2221 P 1	3226 I31					
	2222 B30	3227 J31					
	2223 C30	3228 I32					
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	2300 B10	3232 B32					
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	3009 C 7	3239 N24					
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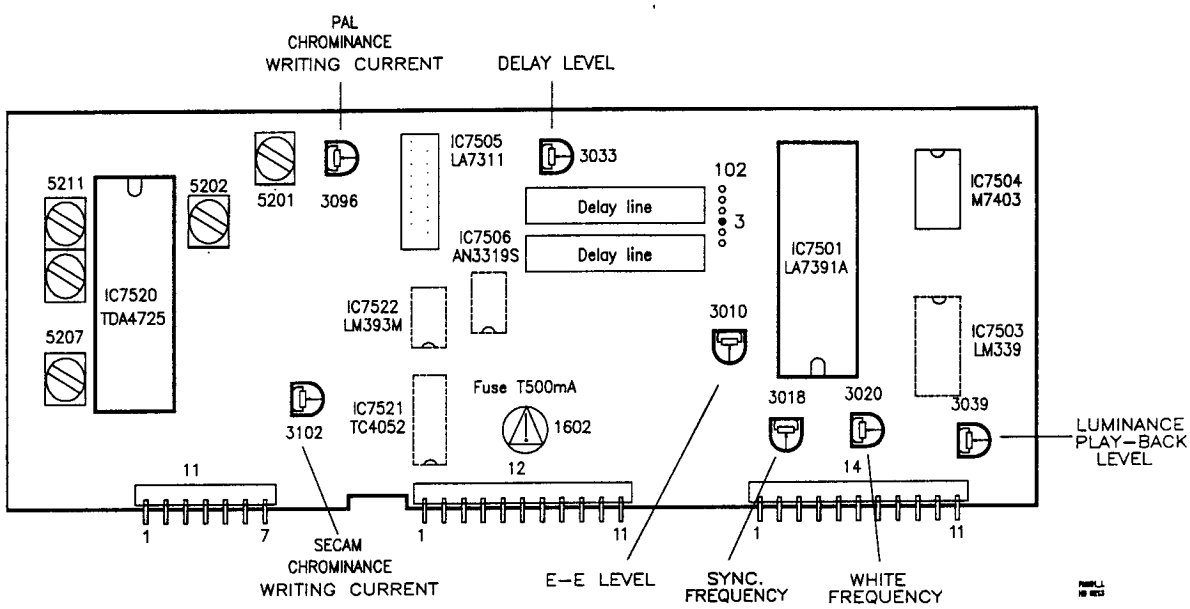
	3016 F 2	3243 I23					



ADJUSTMENTS

1. E-E level (3010)
- Connect a pattern generator and apply a 100% white picture to the Euroconnector (programme E1).
- Select 'Stop' mode.
- Connect an oscillocope to Pin 4 of IC7501.
- Adjust resistor 3010 until the amplitude of the output voltage is 0.5 V_{pp} ± 0.02 V_{pp}.
- Check that the voltage at the connector 2S11 is 1.9 V_{pp} ± 0.1 V_{pp}.

2. Sync frequency (3018)
- Select 'record' mode.
- Apply no signal (programme E1).
- Connect a frequency counter to the 'video current test pin' on the head amplifier.
- Adjust resistor 3018 until the frequency counter indicates 3.800 MHz ± 10 kHz.

3. White frequency (3020)
- Before carrying out this adjustment, check point 1.
- Connect a pattern generator and apply a 100% white picture.
- Select 'record' mode.
- Connect an oscilloscope to the 'video current test pin' on the head amplifier.
- Adjust resistor 3020 until the frequency counter reads 4.600 MHz ± 10 kHz.

4. Writing current adjustment
- Carry out the R3502 and R3096 (R3102) balancing jointly!

a)Luminance writing current adjustment (3502)
- See Input/Output LFBU-IO page 3-12

b)PAL Chrominance writing current adjustment (3096)
- Select 'record' mode.
- Connect an oscilloscope to the 'video current test pin' on the head amplifier.
- Connect a pattern generator and apply a red signal to the Euroconnector (programme E1).
- Connect pin 40 of IC7501 to + 5V.
- Adjust resistor 3096 for a signal amplitude of -14 dB relative to the luminance signal.

c) SECAM Chrominance writing current adjustment (3102)
- Select 'record' mode.
- Connect an oscilloscope to the 'video current test pin' on the head amplifier.
- Connect a pattern generator and apply a red signal to the Euroconnector (programme E1).
- Connect pin 40 of IC7501 to + 5V.
- Adjust resistor 3102 for a signal amplitude of -18 dB relative to the luminance signal.

5. Luminance playback level (3039)
- Play a 100% white picture from a cassette.
- Connect an oscilloscope to connector 2S11.
- Adjust resistor 3039 until the amplitude of the output signal is 1.8 V_{pp} ± 0.05 V_{pp}.

6. LP Delay level (3303)
- Feed a red picture via Scart into the unit.
- Connect an oscilloscope to connector 3/102 (CHROUT)
- Save the amplitude of the PAL burst (should be 120 mV_{pp} ± 30 mV)
- Connect connector 8/14 (HSD) to ground
- Adjust the amplitude of the burst referred to 0 ± 0,8 dB to the previous measured value by means of 3303.
- Disconnect ground connection.
- This adjustment can be checked by reproducing a red picture in Longplay-Still mode. In this case, the flicker at the screen must be minimal.

3-22

CIRCUIT DESCRIPTION PMS
(SINGLE CHIP SIGNAL ELECTRONICS)

1. General

Boards with extension /39 are for PAL/SECAM L.

Heart of the circuit is the IC LA7391A containing all luminance , PAL chroma and SECAM BG chroma circuits in 42 pin shrinked dil case.

For the SECAM L processing the well known TDA4725 is used.

The SECAM BG detector is the LA 7311 discriminator.

CCD 1H delay line is the MSM 7403RS with 5V only supply.

Minor functions have the AN 3319 S as FM AGC the LM 339 as open collector switch in the luminance video processing,the LM393 and the 4052 in the system switch.

2. Record signal path

2.1 Luminance

Pin 39 is the input of the video signal with about 1Vpp . It is then controlled by an AGC amplifier (adjustment via pin 39, time constants pin 38 and pin 16), passes a 6 dB attenuator, a 3.5 MHz low pass filter, a clamp, some switches in the noise canceller/dropout compensator part and is output via an amplifier on pin 3. The signal then goes to an emitter follower, a low pass filter and a second emitter follower to pin 4.

You have to adjust the E/E Level pot to obtain 0.5Vpp on this pin with a 100% white picture. This is necessary for the right values on pin 34 video out and the values of the white and dark clip levels.

Following the signal on pin 4 now without chrominance components it passes a clamp, a detail enhancer (time constant pin 8), a nonlinear emphasis (time constant pin 7, on/off is controlled by the DC level on pin 7) and the main emphasis with internal white and dark clip (time constants between pin 5 and 6).

The signal then goes via the deviation potmeter to pin 42 of the input of the FM modulator. The FM is then filtered, adjusted by the FM record current pot and goes to the summing stage and the head amplifier.

The loop through path outputs the signal via a feedback clamp and an insert stage (control pin 33) to pin 34 and via an emitter follower to the I/O part of the VCR.

2.2 Chrominance PAL

After the in 2.1 mentioned 6dB attenuator the signal also comes to the 4.43Mhz bandpass filter, an ACC (Automatic Chroma Control time constant pin 14), the main converter, a 1 Mhz low pass filter, a killer stage to pin 15 and via the chroma record current to the summing stage.

The 5.06 MHz for the main converter comes via the 5.06 MHz bandpass filter from the sub converter where 4.43

MHz from the VXO and 627kHz from the Line PLL is mixed.

The Line PLL is locked to the composite sync pulse from the sync separator. It uses a 321 x fH VCO (Loop filter on pin 23 and 24). The frequency is then divided by 8 in 4 different 90 degree shifted phases as it is necessary for the VHS standard. Phase shift control input is pin 41 which is also an SP/LP-input.

The Line PLL part also produces the Burst Gate Pulse BGP.

The VXO is locked to the incoming burst signal via the record APC detector (Loop filter pin 17).

This IC uses a special crystal for which no adjustment is necessary. An additional frequency doubler with the output on pin 21 supplies the 8.86 MHz for the CCD.

The H/2 frequency is taken from pin 17. It is the information about the phase of chroma for making color inserts on teletext boards possible in the correct phase (option).

2.3 Chrominance SECAM L

Connector 11/4 (CBVS) is the input terminal for the SECAM signal processing.

Passing the coupling capacitor C2220 the high frequency cloche L5102 compensates the pre distortion of the chrominance amplitude.

The corrected signal is picked up on collector of T7200 and the behind located bandpass is filtering out the chrominance component of the CVBS signal which will be supplied on pin 25 of the SECAM chrominance processor TDA4725.

At first the signal will be amplified around 15dB. After entering pin 22 the signal is limited and than divided by 4 to get the chrominace information which can be recorded on the tape.

The bandbass (L5213, L5214 C2223, C2222, C2224, C2211 and R3209) is necessary to get only the main chrominance components for the further processing.

T7202 short down the chrominance information during the blanking period to avoid distortions.

Entering pin 17 the signal passes a 10 dB amplifier and the record/playback switch. In between pin 13 and 12 a low frequency cloche is located which makes the necessary pre distortion for the record process.

Than the signal pass a internal limiter and leaves the IC on pin 15 as SECAM chrominance current.

With R3102 the current is adjusted to -16dB with respect to Y and than added to the luminance current with R3101.

Colour switch system for multistandard

The PAL colour killer decides which colour system operates.

No PAL means SECAM L!

So black and white signals (without burst) is processed like SECAM L as it is in todays ISE 5 electronics.

Switching voltage CSI3 is generated by the LM393 comparator which detects the voltage level of pin 26 IC7501 the colour killer integrator pin.

3. Playback signal path

3.1 Luminance

The FM playback voltage passes the AGC amplifier

AN3319S and the FM processing circuit which gives the necessary filter characteristics and is input to pin 39.

The FM then goes to a double limiter stage, a FM - demodulator and a sub low pass filter. Pin 3 has a high impedance in play so the connected R/C components act as a linear deemphasis.

Pin 2 allows a correction of frequency response and the adjustment of the Y PB Level. Measuring point for this level is the output pin 34 while you play back a standard 100% white recording.

After correction of the frequency response in the external low pass filter now switched by the LM339 to a slightly different characteristic, the video passes, via pin 4, the 3.5 MHz low pass, the noise canceller and dropout compensator part.

For both functions the 1 H CCD is necessary. Pin 12 supplies the video to the CCD and pin 10 receives the signal where a Voltage Controlled Amplifier VCA adjusts automatically the gain tolerances of the CCD. For this function the capacitor of pin 9 is important.

You can check CCD function by connecting pin 2 to 5V in E/E mode and then measure on pin 32 the difference signal of 2 lines.

After the noise canceller the video passes the nonlinear deemphasis (time constant pin 7 as rec), a noise canceller (time constant pin 8), the picture control stage (controlled by DC on pin 13 2V = soft, 3V = sharp), the Y/Chroma mixing stage and the video output amp to pin 34.

3.2 Chrominance PAL

627kHz Chroma from tape goes through a 1 MHz low pass filter and an amplifier with group delay correction to pin 15 of the IC. The chroma is amplified, controlled in the ACC amplifier, mixed with 5.06 MHz and goes via the 4.43 MHz bandpass and an amplifier to the combfilter where crosstalk components from the neighbor tracks are removed.

The chroma then comes back to the IC at pin 27 where it is amplified, leaves at pin 31 and comes back again at pin 29 via an emitter follower acting as a switch for other chroma systems. Pin 29 is the input of the Y/C mixing stage.

In play the 5.06 MHz frequency is made by the free running 4.43 MHz crystal oscillator and the 321 fH VCO. It is controlled by the PB APC loop, generating a signal from the outgoing burst and the 4.43 MHz of the crystal.

3.3 Chrominance SECAM L

The signal coming from the head amplifier enters the P.C.B on connector 12/10 (FMPV).

Passing the components R3207 and C2205 and trap L5205 and C2206 to suppress interference the signal enters the chrominance processor on pin 21.

Then the signal is amplified by 6dB and pass the record/playback switch. The enclosed 1.07 MHZ bandpass filters the chrominance information from the spectrum.

T7202 is not active during playback so the signal goes directly to pin 17 and is amplified again by 10dB.

Passing the playback/record switch the signal arrives the low frequency cloche - which cancels the pre distortion - via pin 16.

A gain controlled amplifier in the TDA4725 removes the fluctuation of the signal during playback.

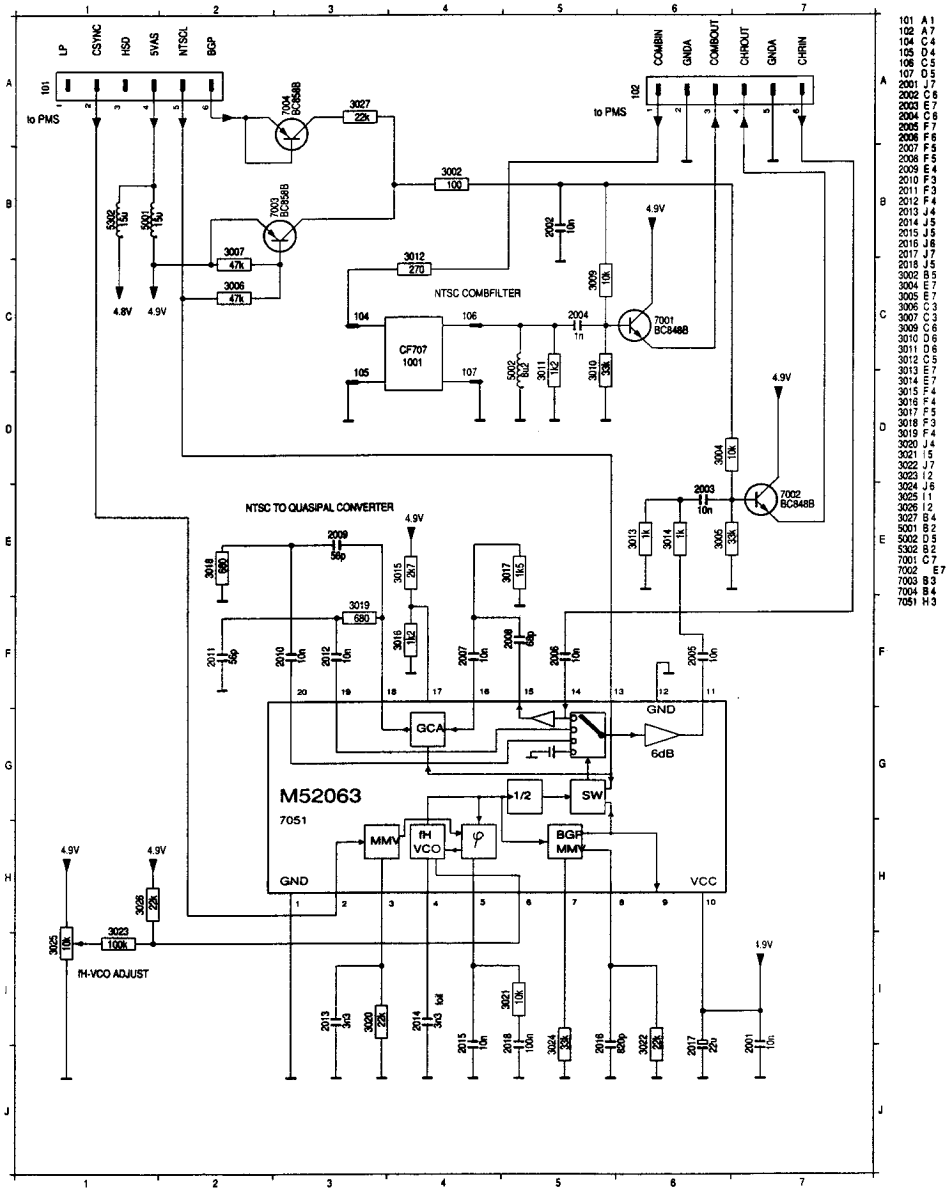
Now the stabile signal is doubled and the main component is filtered by L5211 (2,17MHZ).Then the signal will again multiplied by 2 after passing pin 6.

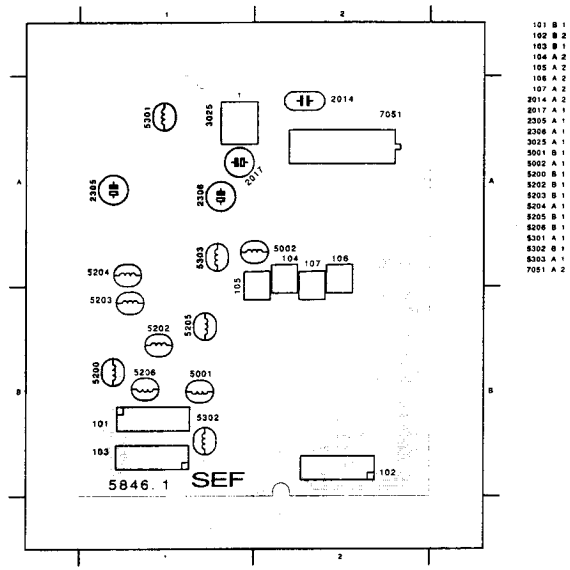
A 10dB amplifier gives the signal the necessary amplitude for the high frequency anticloche behind pin 27.

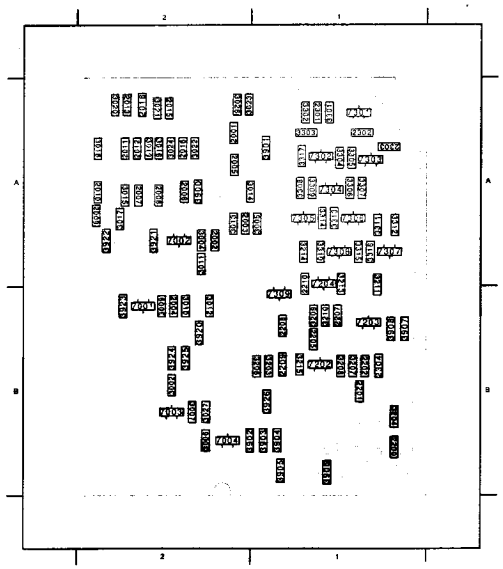
The output is a standard SECAM L signal.

In between pin 28 and 1 there is a secam ident circuit. The 4.3 MHZ bandpass behind pin1 removes the last distortions and so the signal enters pin 29 IC7501 to the Y/C mixer after passing C2053 and emitter follower T7203.

NTSC-PLAYBACK PANEL

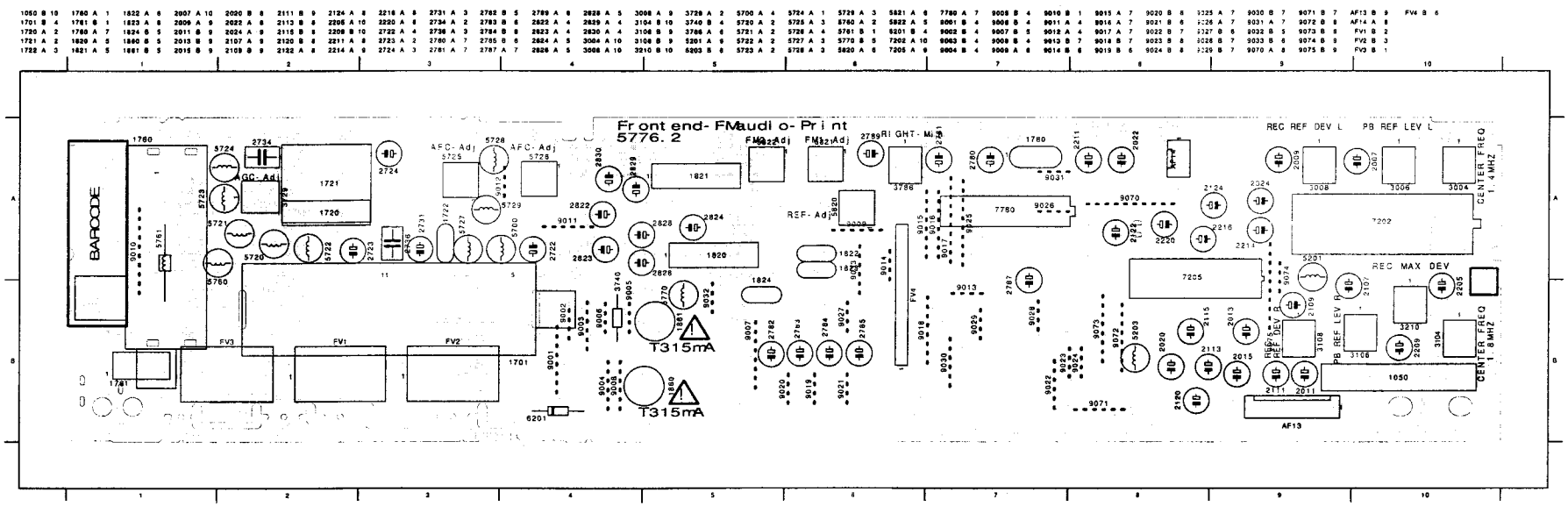




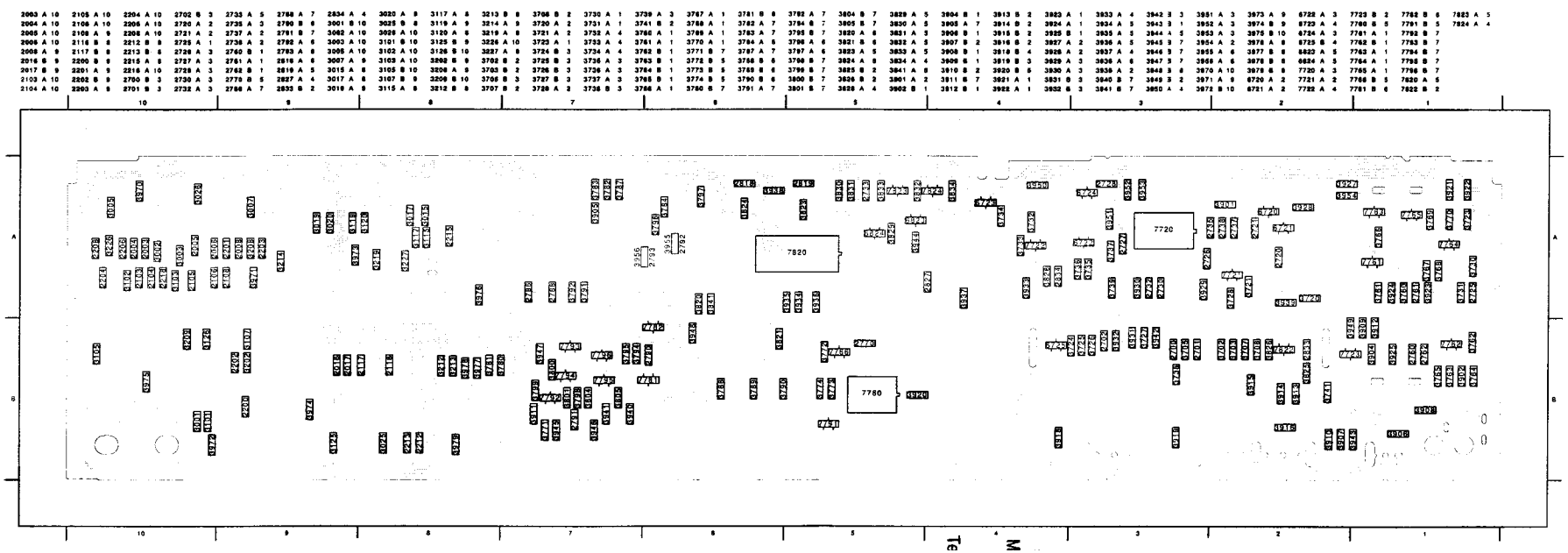


CS 37037

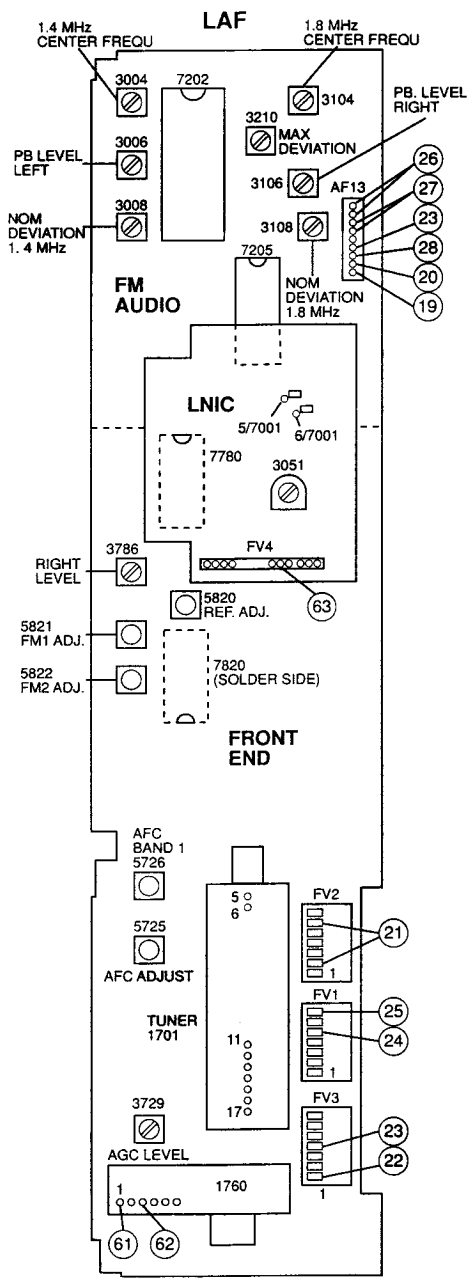
FM AUDIO, FRONT END LAF



FM AUDIO, FRONT END LAF



3-26



ADJUSTMENTS AT THE FRONT END LAF-FV

1. Rf-AGC adjustment (3729)

- Supply a PAL white picture with an amplitude of 2,2 mV_{eff} (67 $dB_{\mu}V$) with sound carrier, but without tone modulation, via Front End.
- Connect an oscilloscope to Pin 17 of the tuner 1701
- Adjust to 800 $mV_{pp} \pm 1$ dB by means of 3292.

2. AFC-adjust (5725)

- Supply a colour bar signal via Front End (Channel E25).
- Connect a voltmeter to connector 5FV3.
- Adjust to 2.5 V by means of 5740

3. AFC-SECAM Band 1 adjust (5726)

- As 1.), but supply SECAM band 1 signal.
- Adjustment by means of 5726.

4. Alignment to minimal interferences through the video-IF (5820)

- Connect a pattern generator via the aerial jack and feed an unmodulated stereo signal
- Connect a two-beam oscilloscope to pin 9 and 10 of IC 7820
- align to minimal interferences with 5820

5. Alignment of the 5.5 MHz FM demodulator (5821)

- Connect a pattern generator via the aerial jack and feed a stereo signal modulated on both sides (1 kHz)
- Connect an oscilloscope to pin 10 of IC 7820
- Align to maximum amplitude with 5821

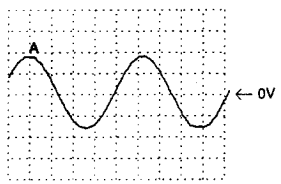
6. Alignment of the 5.74 MHz FM demodulator (5822)

- Connect a pattern generator as described in Item 5
- Connect an oscilloscope to pin 9 of IC 7820
- Align to maximum amplitude with 5822

7. Alignment of the output voltage (3786)

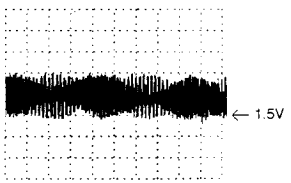
- Connect a pattern generator as described in Item 5
- Connect a two-beam oscilloscope to pin 11 and pin 12 of IC 7780
- Set both signals to the same amplitude with 3786

A: DC, 0.5 V/Div, 0.2 ms/Div



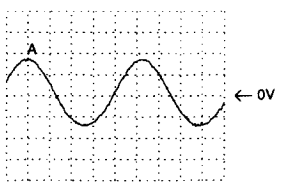
Osc 25
7FV1 AFVM

A: AC, 0.2 V/Div, 1 us/Div



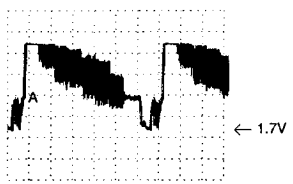
Osc 63
5FV4 SSIF

A: DC, 0.5 V/Div, 0.2 ms/Div



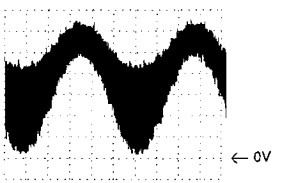
Osc 21
2/6 FV2 AFVL/AFVR

A: AC, 0.2 V/Div, 10 us/Div



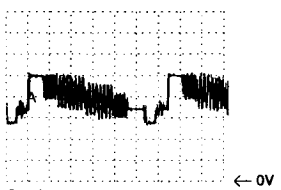
Osc 61
1/1760 VMCO

A: DC, 0.5 V/Div, 0.2 ms /Div



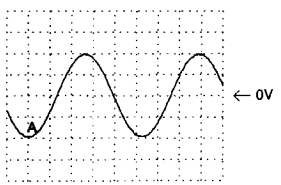
Osc 64
9/7820

A: DC, 0.5 V/Div, 10 us/Div



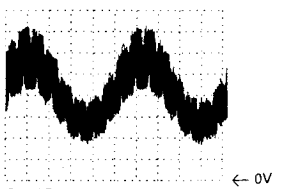
Osc 24
5FV1 VFV

A: DC, 0.5 V/Div, 0.2 ms/Div



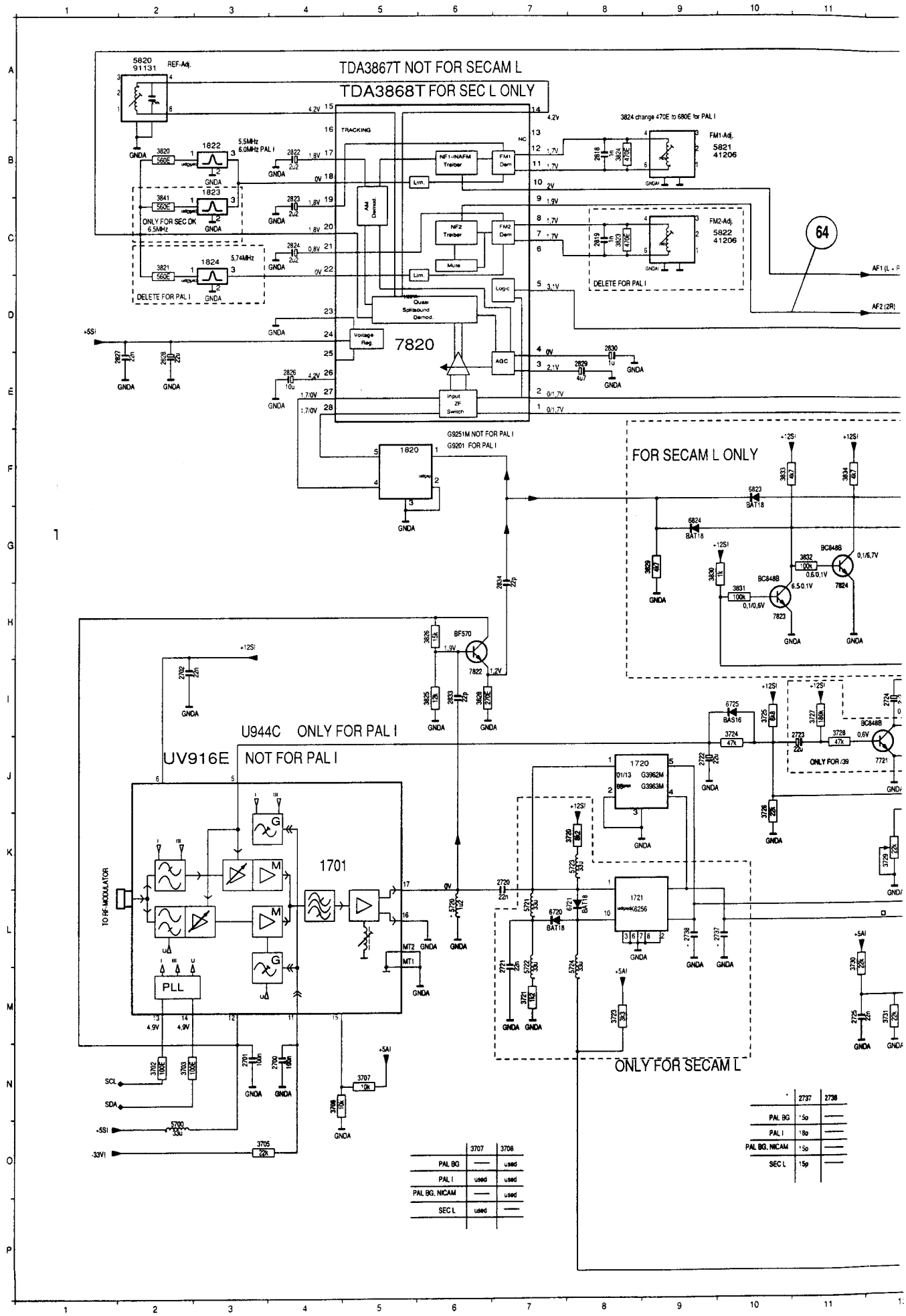
Osc 62
3/1760 AMCO

A: DC, 0.5 V/Div, 0.2 ms/Div



Osc 65
10/7820

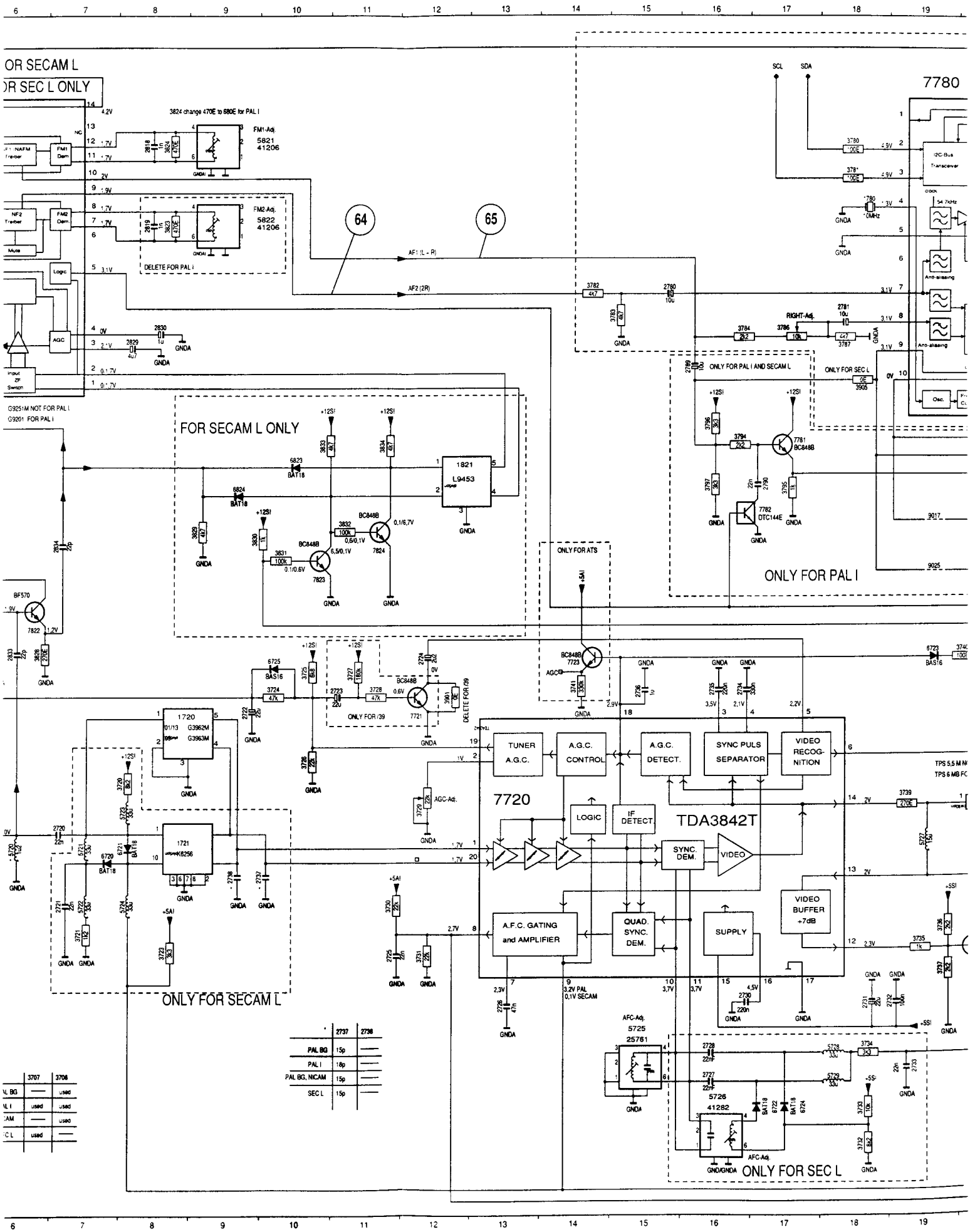
FRONT END LAF-FV

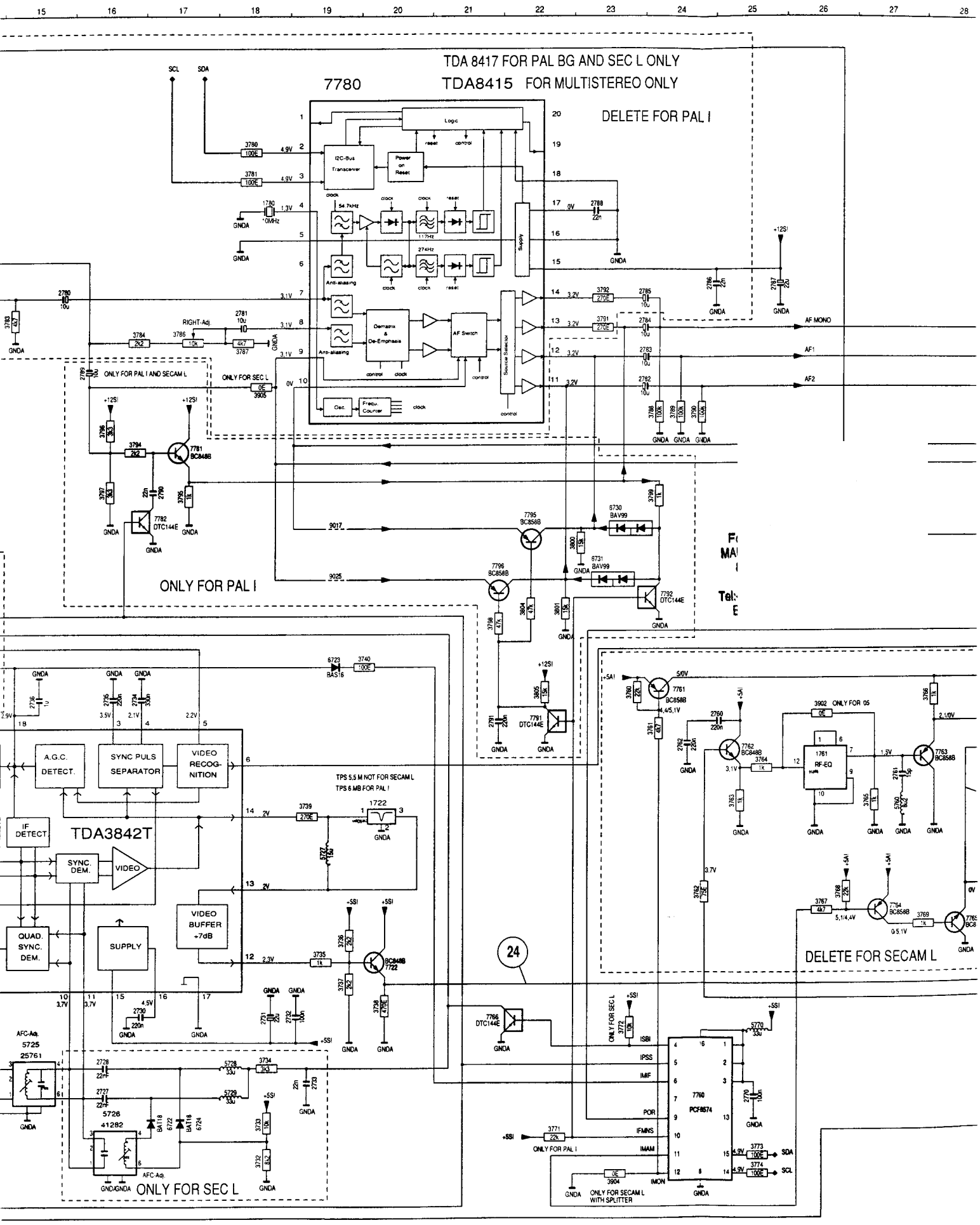


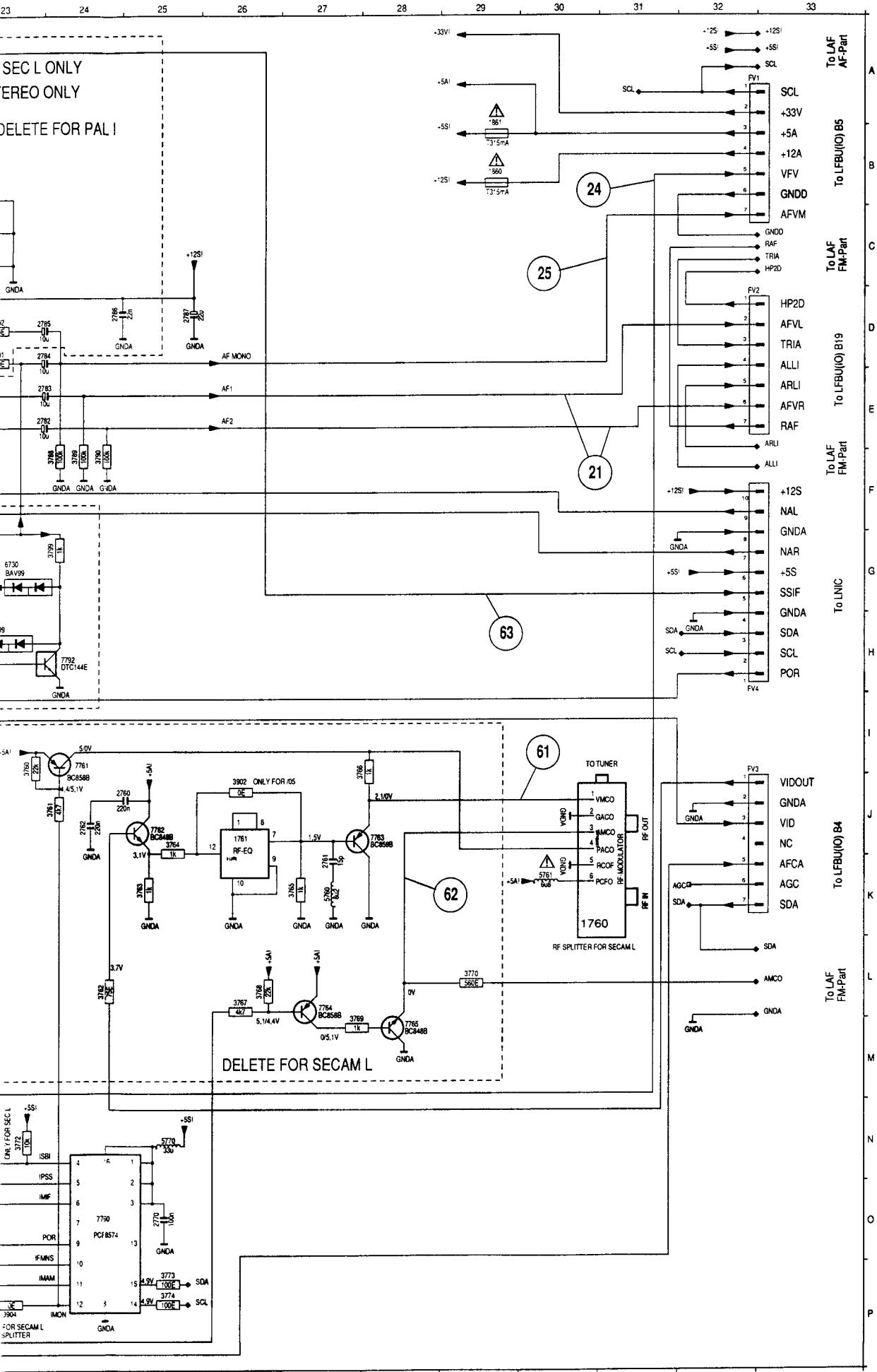
	3707	3708
PAL BG	—	used
PAL I	used	used
PAL BG, NICAM	—	used
SEC L	used	—

	2737	2738
PAL BG	15p	—
PAL I	18p	—
PAL BG, NICAM	15p	—
SEC L	15p	—

3-27

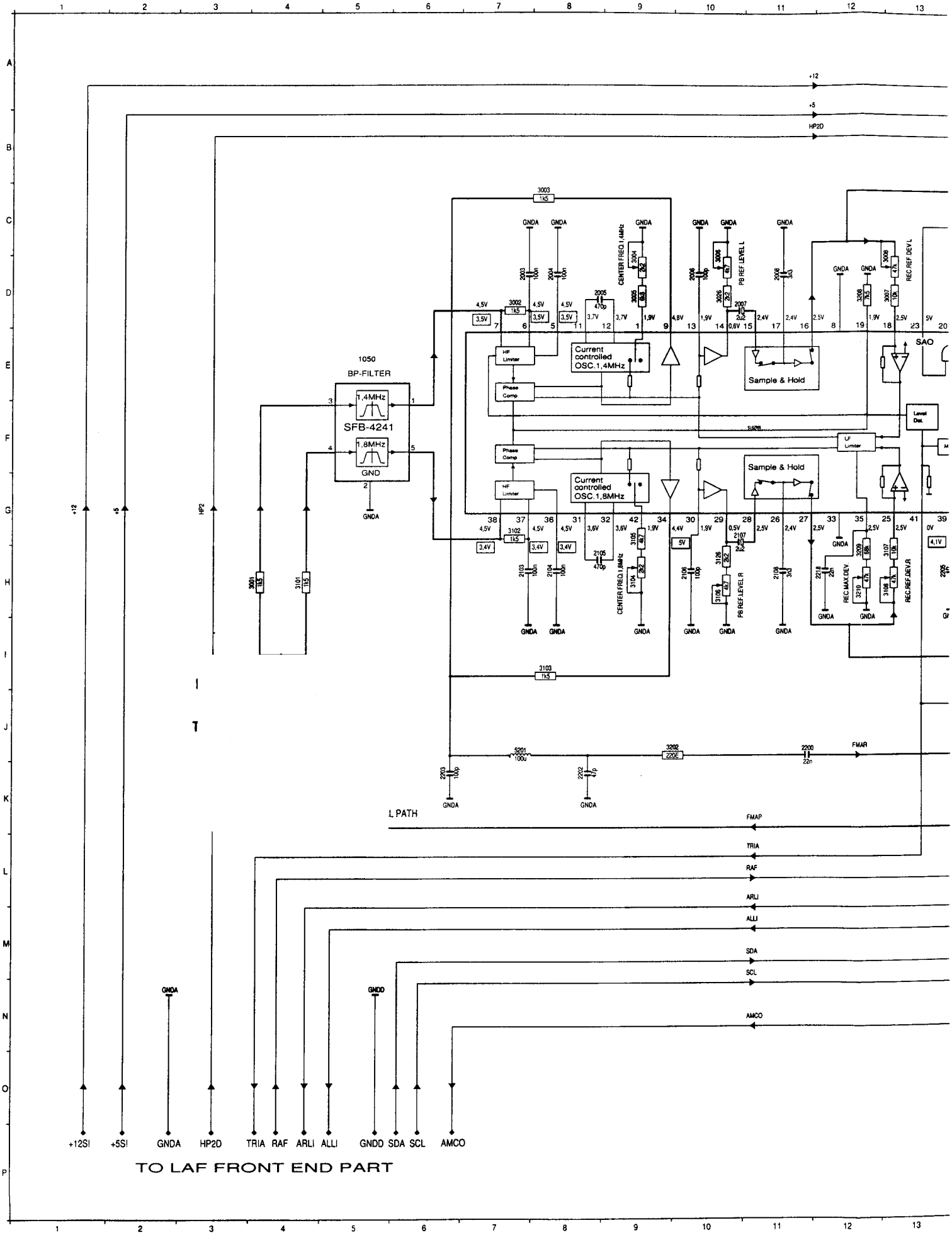

OR SECAM L
OR SEC L ONLY
7780
SCL
SDA
3824 change 470E to 680E for PAL I
FM1-Adj.
5821
41206
FM2-Adj.
5822
41206
DELETE FOR PAL I
64
65
AF1 (L - R)
AF2 (2R)
RIGHT-Adj.
ONLY FOR PAL I AND SECAM L
ONLY FOR SEC L
ONLY FOR PAL I
G9251M NOT FOR PAL I
G9201 FOR PAL I
FOR SECAM L ONLY
BAT18
L9453
BC848B
7781
DTC144E
ONLY FOR ATS
BF570
BAS16
ONLY FOR /39
DELETE FOR /39
7720
TDA3842T
TUNER A.G.C.
A.G.C. CONTROL
A.G.C. DETECT.
SYNC PULS SEPARATOR
VIDEO RECOG-NITION
LOGIC
IF DETECT.
SYNC. DEM.
VIDEO
A.F.C. GATING and AMPLIFIER
QUAD. SYNC. DEM.
SUPPLY
VIDEO BUFFER +7dB
AGC-Adj.
AFC-Adj.
5725
25761
5726
41282
ONLY FOR SECAM L
ONLY FOR SEC L
TPS 5,5 M NI
TPS 6 MB FC
PAL BG 15p
PAL I 18p
PAL BG, NICAM 15p
SEC L 15p

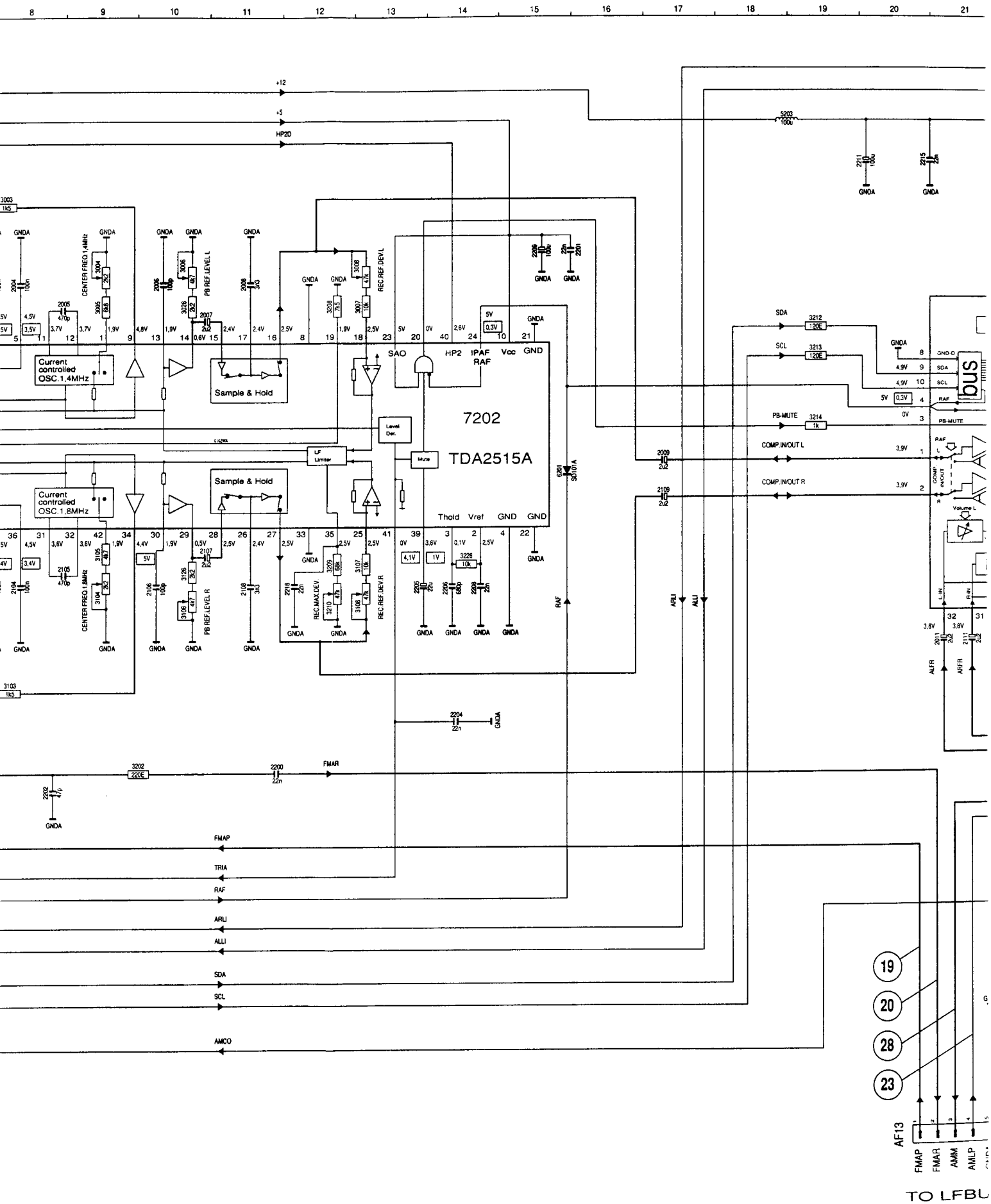

TDA 8417 FOR PAL BG AND SEC L ONLY
7780
TDA8415 FOR MULTISTEREO ONLY
DELETE FOR PAL I
SCL
SDA
I2C-Bus Transceiver
Power on Reset
Logic
Dematrix & De-Emphasis
AF Switch
Source Selector
Anti-aliasing
Supply
Osc.
Frequ. Counter
AF MONO
AF1
AF2
RIGHT-Adj.
ONLY FOR PAL I AND SECAM L
ONLY FOR SEC L
ONLY FOR PAL I
TDA3842T
A.G.C. DETECT.
SYNC PULS SEPARATOR
VIDEO RECOG-NITION
IF DETECT
SYNC. DEM.
VIDEO
QUAD. SYNC. DEM.
SUPPLY
VIDEO BUFFER +7dB
TPS 5.5 M NOT FOR SECAM L
TPS 6 MB FOR PAL I
DELETE FOR SECAM L
ONLY FOR SEC L
ONLY FOR SECAM L WITH SPLITTER
PCF8574
RF-EQ
ISBI
IPSS
IMIF
POR
IFMNS
IMAM
IMON
SDA
SCL
AFC-Adj.
24

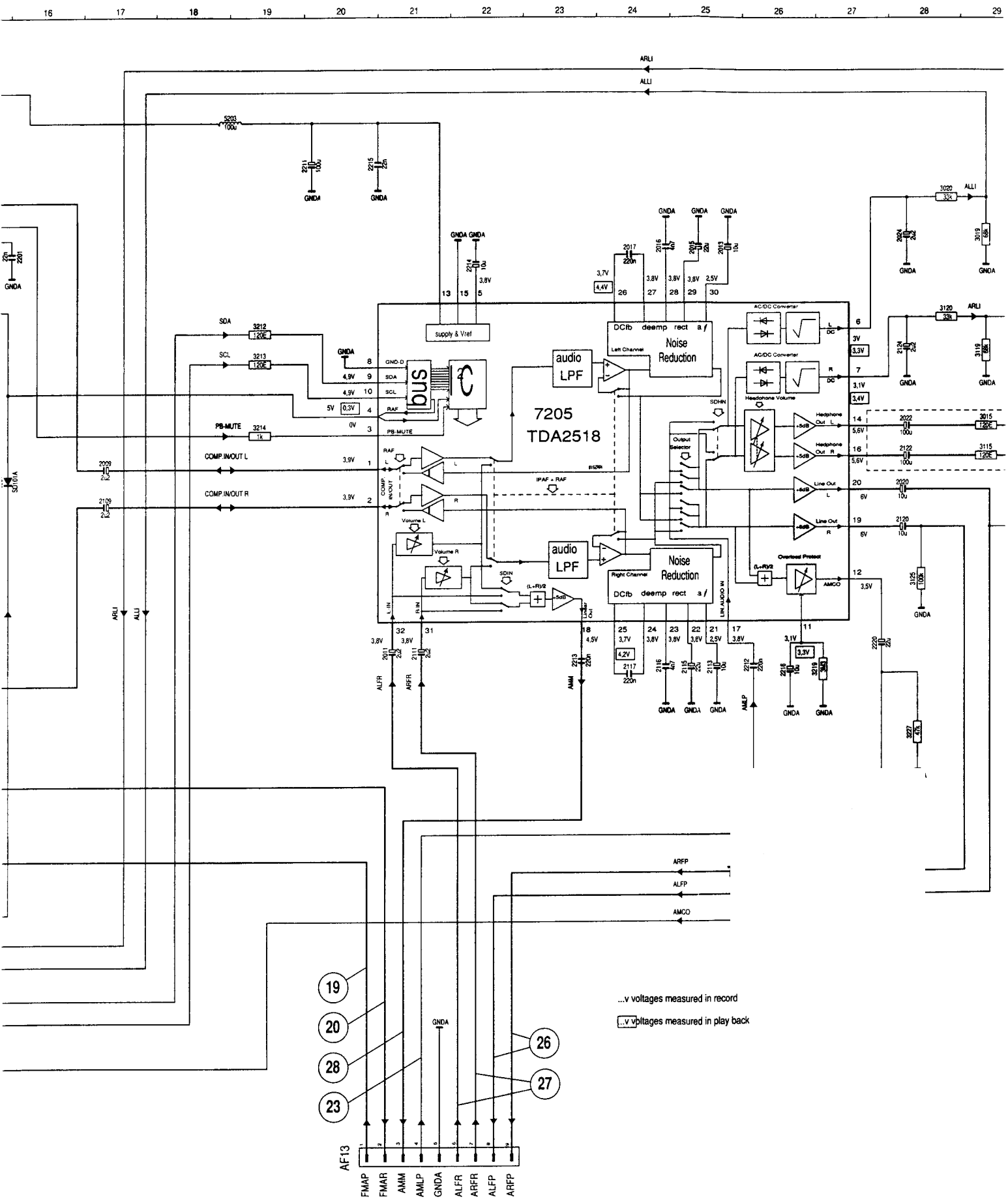


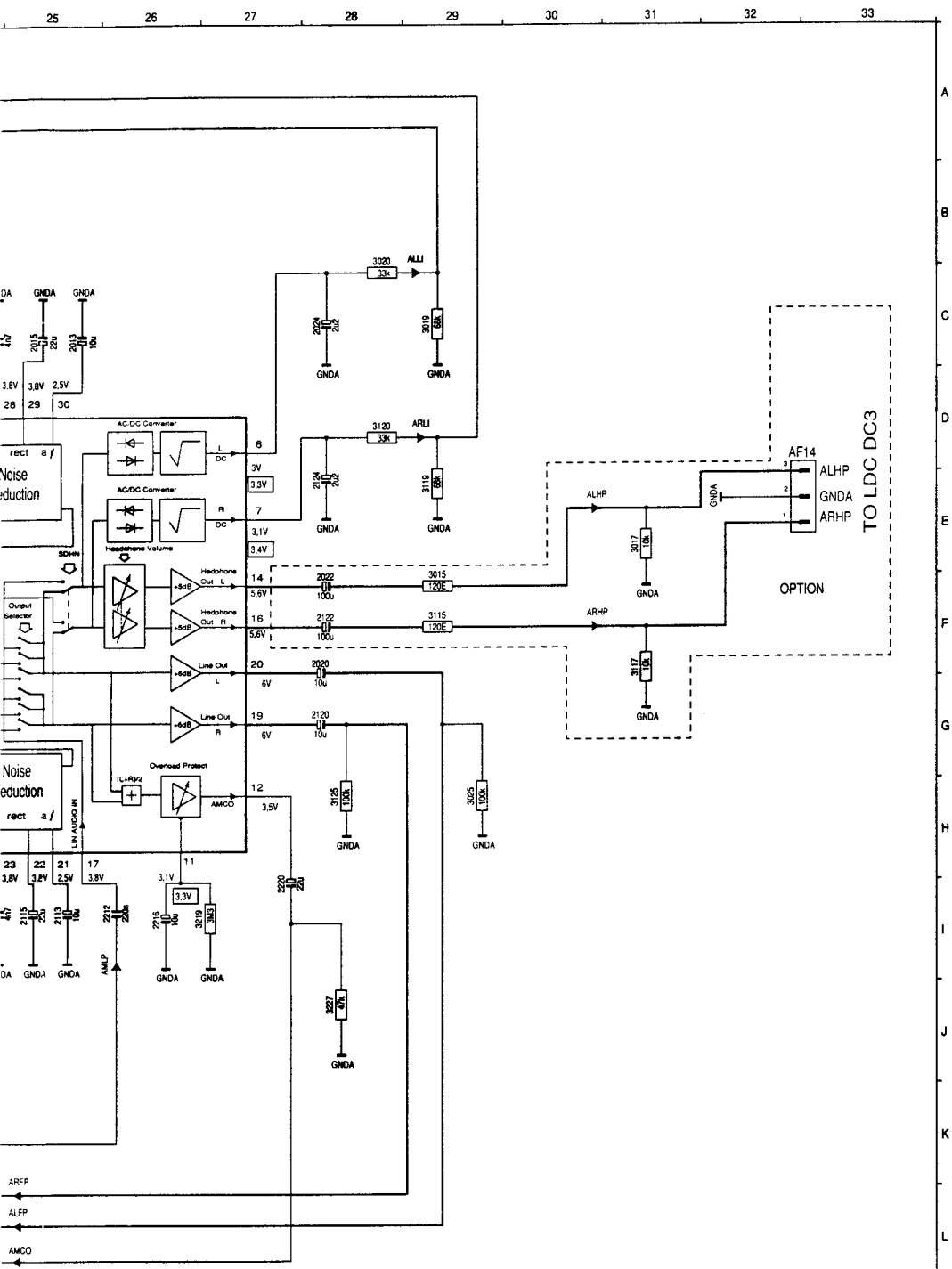
	1701 K 4	3901 J12							
	1720 J 8	3902 J26							
	1721 L 8	**3904 P23**							
	1722 K20	**3905 E18**							
	1760 K30	5700 O 2							
A	1761 J26	5720 L 6							
	1780 C18	5721 L 7							
	1820 F 6	**5722 M 7**							
	1821 F12	**5723 K 8**							
	1822 B 3	**5724 M 8**							
	1823 B 3	**5725 N15**							
	1824 C 3	**5726 O16**							
	1860 B29	**5727 L19**							
	1861 B29	**5728 O18**							
B	2700 N 4	5729 O18							
	2701 N 3	5760 K27							
	2702 I 2	5761 K30							
	2720 K 7	5770 N25							
	2721 M 7	5820 A 2							
	2722 J 9	5821 B 9							
	2723 J11	5822 C 9							
	2724 I12	6720 L 7							
	2725 M11	6721 L 8							
C	2726 N13	6722 O17							
	2727 O16	6723 I19							
	2728 O16	6724 O17							
	2730 N16	6725 I10							
	2731 N18	6823 F10							
	2732 N19	6824 G 9							
	2733 O19	7720 K13							
	2734 J16	7721 J12							
	2735 J16	7722 M20							
D	2736 J15	7723 I14							
	2737 L10	7760 O24							
	2738 L 9	7761 I24							
	2760 J25	7762 J25							
	2761 K27	7763 J28							
	2762 J24	7764 L27							
	2770 O25	7765 M28							
	2780 D15	7766 N21							
E	2781 D18	7780 A19							
	2782 E23	7781 F17							
	2783 E24	7782 G17							
	2784 D23	7791 J22							
	2785 D23	7792 H24							
	2786 D24	7793 G23							
	2787 D25	7794 G24							
	2788 C23	7795 G22							
	2789 E16	7796 H21							
F	2790 G17	7820 E 5							
	2791 J21	7822 I 6							
	2818 B 8	7823 H10							
	2819 C 8	7824 H11							
	2822 B 4	9017 G19							
	2823 C 4	9025 H19							
	2824 C 4	FV1 A32							
	2826 E 4	FV2 D32							
G	2827 E 2	FV3 J32							
	2828 E 2	FV4 H32							
	2829 E 8								
	2830 E 8								
	2833 I 6								
	2834 H 7								
	3702 N 2								
	3703 N 2								
H	3705 O 3								
	3707 N 5								
	3708 N 4								
	3720 K 8								
	3721 M 7								
	3723 M 8								
	3724 J10								
	3725 I10								
	3726 K10								
I	3727 I11								
	3728 J11								
	3729 K12								
	3730 M11								
	3731 M12								
	3732 P18								
	3733 O18								
	3734 O18								
	3735 M19								
J	3736 M19								
	3737 M19								
	3738 N20								
	3739 K19								
	3740 I20								
	3741 I14								
	3760 I23								
	3761 J24								
K	3762 L24								
	3763 K25								
	3764 J25								
	3765 K27								
	3766 I28								
	3767 L26								
	3768 L26								
	3769 M27								
L	3770 L29								
	3771 O22								
	3772 N23								
	3773 P25								
	3774 P25								
	3780 B18								
	3781 B18								
	3782 D14								
M	3783 D15								
	3784 E16								
	3786 E17								
	3787 E18								
	3788 F24								
	3789 F24								
	3790 F24								
	3791 D23								
	3792 D23								
N	3794 F16								
	3795 G17								
	3796 F16								
	3797 G16								
	3798 H21								
	3799 G24								
	3800 G23								
	3801 H22								
	3804 H22								
O	3805 I22								
	3820 B 2								
	3821 C 2								
	3823 C 8								
	3824 B 8								
	3825 I 6								
	3826 H 6								
	3828 I 6								
	3829 G 9								
P	3830 G 9								
	3831 H10								
	3832 G11								
	3833 F10								
	3834 F11								
	3841 C 2								

FM-AUDIO LAF-FM




7202
TDA2515A
SAO
HP2
IPAF
RAF
Vcc
GND
Thold
Vref
Sample & Hold
Current controlled OSC.1,4MHz
Current controlled OSC.1,8MHz
Level Det.
LF Limiter
Mute
+12
+5
HP20
SDA
SCL
PB-MUTE
COMP.IN/OUT L
COMP.IN/OUT R
FMAP
TRIA
RAF
ARLI
ALLI
AMCO
FMAR
AF13
TO LFBU


7205
TDA2518
audio LPF
audio LPF
Noise Reduction
Noise Reduction
Supply & Vref
I²C bus
Left Channel
Right Channel
Volume L
Volume R
Headphone Volume
Output Selector
Overload Protect
AC/DC Converter
Line Out
Headphone Out
COMP.IN/OUT L
COMP.IN/OUT R
PB-MUTE
SDA
SCL
ARLI
ALLI
ARFP
ALFP
AMCO
...v voltages measured in record
...v voltages measured in play back
AF13
FMAP
FMAR
AMM
AMLP
GNDA
ALFR
ARFR
ALFP
ARFP
TO LFBU(IO) B7



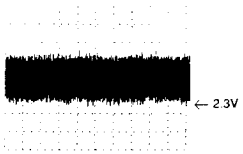
1050 E 5
2003 D 7
2004 D 8
2005 D 8
2006 D10
2007 D10
2008 D11
2009 F17
2011 I21
2013 C25
2015 C25
2016 C24
2017 C24
2020 F28
2022 F28
2024 C28
2103 H 7
2104 H 8
2105 H 8
2106 H10
2107 G10
2108 H11
2109 G17
2111 I21
2113 I25
2115 I25
2116 I24
2117 I24
2120 G28
2122 F28
2124 E28
2200 J11
2201 C16
2202 K 8
2203 K 6
2204 J14
2205 H13
2206 H14
2208 H14
2209 C15
2211 B20
2212 I26
2213 I23
2214 C22
2215 B20
2216 I26
2218 H12
2220 I27
3001 H 4
3002 D 7
3003 C 8
3004 D 9
3005 D 9
3006 D10
3007 D13
3008 D13
3015 F29
3017 E31
3019 C29
3020 C28
3025 H29
3026 D10
3101 H 4
3102 G 7
3103 I 8
3104 H 9
3105 G 9
3106 H10
3107 H13
3108 H13
3115 F29
3117 F31
3119 E29
3120 D28
3125 H28
3126 H10
3202 J 9
3208 D12
3209 H12
3210 H12
3212 D19
3213 E19
3214 F19
3219 I27
3226 H14
3227 J28
5201 J 7
5203 B18
6201 F15
7202 F14
7205 F23
AF13 P20
AF14 D32

neasured in record

neasured in play back

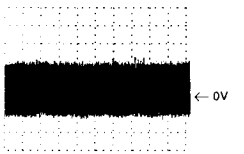
3-29

A: AC, 0.2 V/Div, 5 ms/Div



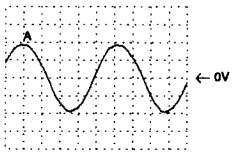
Osc 19
1AF13 FMAP

A: DC, 0.2 V/Div, 5 ms/Div



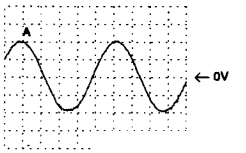
Osc 20
2AF13 FMAR

A: DC, 0.5 V/Div, 0.2 ms/Div



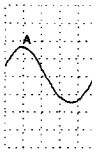
Osc 23
4AF13 AMLP

A: DC, 0.5 V/Div, 0.2 ms/Div



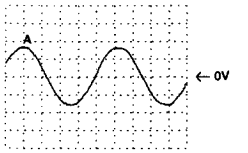
Osc 26
8/9 AF13 ALFP/

A: DC, 0.5 V/Di



Osc 27
6/7 AF13 ALFR/

A: DC, 0.5 V/Di



Osc 28
3AF13 AMM

SETTINGS OF THE LAF-FM AUDIO SECTION

The settings of Items 2 and 3 are set to an exact value in the works and must ONLY be changed if important components of the FM modulator, among them the modem ICs 2515, have been replaced.

1. Setting the carrier frequency

1.1 Setting the 1.4 MHz carrier frequency (3004)

- Connect a capacitor of 220 nF between pin 34 of IC7202 and the chassis
- Connect a frequency meter to 2AF13
- switch the recorder to the recording mode
- Regulate the frequency to 1.4 MHz ± 5 kHz with 3004
- Disconnect the capacitor between pin 34 of IC 7202 and chassis

1.2 Setting of the 1.8 MHz carrier frequency (3104)

- Connect a capacitor of 220 nF between pin 9 of IC7202 and chassis
- Connect a frequency meter to the 2AF13
- switch the recorder to the recording mode
- Regulate the frequency to 1.8 MHz ± 5 kHz with 3104
- Disconnect the capacitor between pin 9 of IC7202 and chassis

2. Setting of the maximum FM swing

Measurement preparation:

- Turn controls for the nominal FM swing (3210) completely to the left (maximum amplitude)
- Make a recording of an input signal of 1.5 V_{eff} (measured at 6AF13 for the left and 7AF13 for the right) and 10 kHz

2.1 Setting the maximum FM swing for 1,4 MHz (3210)

- Connect a capacitor of 220 nF between connection 34 of IC7202 and the chassis
- Connect an oscilloscope to 2AF13
- Switch the recorder to the recording mode
- Trigger the oscilloscope to the correct position
- Increase the fifth period T with the "DELAYED TIME BASE" and measure the deviation
- The time T should be equal to 0,63 µs ± 0,15 µs; this corresponds to an FM swing of approx. 150 kHz
- Remove the capacitor between pin 34 of IC7202 and the chassis
- Now adjust the nominal FM swing according to 3.1

2.2 Control of the maximum FM swing for 1,8 MHz

- Connect a capacitor of 220 nF between connection 9 of IC7202 and the chassis
- Connect an oscilloscope to 2AF13
- Switch the recorder to the recording mode
- Trigger the oscilloscope to the correct position
- Increase the fifth period T with the "DELAYED TIME BASE" and measure the deviation
- The time T should be equal to 0,46 µs ± 0,09 µs; this corresponds to an FM swing of approx. 150 kHz
- Remove the capacitor between pin 9 of IC7202 and the chassis
- Now adjust the nominal FM swing according to 3.2

3. Setting the nominal FM swing

Measurement preparation:

- Make a recording of an input signal of 250 mV_{eff} (measured at 6AF13 for the left and 7AF13 for the right) and 1 kHz

3.1 Setting of the nominal FM swing for 1,4 MHz (3008)

- Connect a capacitor of 220 nF between pin 34 of IC7202 and chassis
- Connect an oscilloscope to 2AF13
- Switch the recorder to the recording mode
- Trigger the oscilloscope to the correct position
- Increase the fifth period with the "DELAYED TIME BASE" and measure the deviation
- Regulate the time T with 3008 so that it is equal to 0.25 µs ± 0,06 µs; this corresponds to an FM swing of approx. 56 kHz
- Remove the capacitor between connection 34 of IC7202 and the chassis

3.2 Setting the nominal FM swing for 1.8 MHz (3108)

- Connect a capacitor of 220 nF between connection 9 of IC7202 and chassis
- Connect an oscilloscope to 2AF13
- Switch the recorder to the recording mode
- Trigger the oscilloscope to the correct position
- Increase the fifth period T with the "DELAYED TIME BASE" and measure the deviation
- Regulate the time T with 3108 so that it is equal to 0.17 µs ± 0,03 µs; this corresponds to an FM swing of approx. 56 kHz
- Remove the capacitor beteen connection 9 of IC7202 and the chassis

4. Setting the demodulator (amplitude reproduction)

Before the demodulator is regulated, one should be convinced that the adjustments of the FM swing are correct. If this is not the case, they must first be set in accordance with Items 2 and 3.

Measurement preparation:

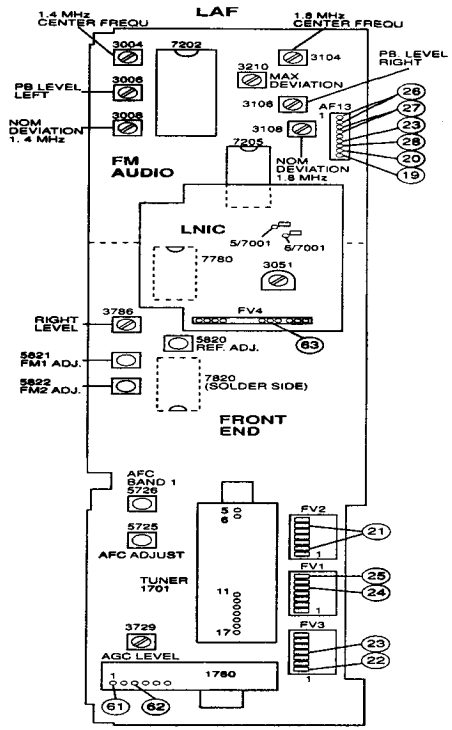
- Make a recording of an input signal of 250 mV_{eff} (measured at 6AF13 for the left and 7AF13 for the right) and 1 kHz

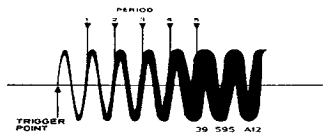
4.1 Setting of the 1,4 MHz demodulator (3006)

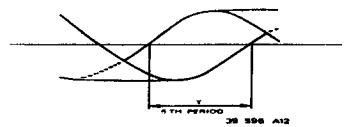
- Connect a millivoltmeter to 8AF13
- Reproduce the recording made above
- Regulate the voltage to 250 mV_{eff} ± 10 mV with 3006

4.2 Setting of the 1,8 MHz demodulator (3106)

- Connect a millivoltmeter to 9AF13
- Reproduce the recording made above
- Regulate the voltage to 250 mV_{eff} ± 10 mV with 3106







3-30

FM-AUDIO

1. Noise reduction IC: TDA 2518
2. Functional description MODEM IC: TDA 2515

The IC TDA 2518 has been particularly developed for the application in FM-Audio circuits of VHS video recorders. To ensure the required noise reduction, the incoming Audio signal is compressed during Record, before it is FM-modulated in the MODEM IC TDA 2515.

In Playback, the compressed signal is demodulated in the MODEM IC 2515 and expanded in the noise reduction IC TDA 2518.

1. Noise reduction

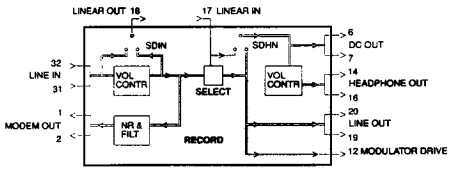
The IC TDA 2518 is entirely controlled via the I^2C-bus (amplification, outputs, operating modes ....)

1.1 Record

The Audio signals are led by Line-in (Pin 31, 32) via a gain control for L and R. The signal for Linear Audio (Pin 18) is deviated before or after this gain control. The Audio signals then pass the noise reduction and filter block and are available at the outputs (Pin 1, 2) as compressed signals.

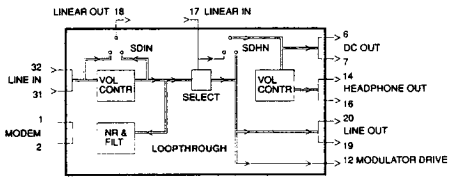
The selector switch block offers the possibility to choose between 8 different signal modes, e.g. Stereo, Right, Left, Mono only, and the mixted signals with Linear In (Pin 17), e.g. Stereo mix, Left mix, Right mix.

The signals can also be switched for the record level indication (Pin 6, 7) DC out and for the headphone gain control to Linear In (Pin 17).



1.2 Looping through

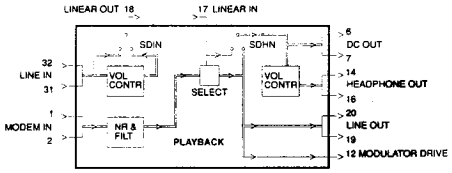
This operating mode is almost identical with Record, with the difference that the outputs (Pin 1, 2) to the MODEM are highly resistive. RAF (Pin 4) is LOW (OV).



1.3 Playback

The compressed Audio signals from the inputs (Pin 1, 2) are expanded in the noise reduction and filter block and, after the selector switch, are ready for the gain controls.

There is a special feature for postsynchronization: the original sound from the FM tracks is available at the outputs (20, 19) Line out, can be mixted externally and led via the inputs (31, 32) Line in and the gain control to Linear out (Pin 18). This signal can be recorded on the Linear track (postsynchronization).



1.4 Mute

Mute via 12C means, that all outputs are muted.

During Replay, the signals from MODEM In (Pin 1, 2) can additionally be muted via Pin 3.

The mute via the gain controls (L, R and headphones) is independent of the two above mentioned possibilities.

1.5 RAF (Record Audio FM)

The RAF signal (Pin 4) controls the MODEM-IC as a source of electric power. If RAF = 0 (0V), a current flows through this Pin.

2. Modulator / Demodulator (MODEM)

2.1 Record

The operating state of the MODEM IC TDA 2515 is controlled via the RAF signal. Low (OV) is Playback, high (+5) is Record.

The compressed Audio signal at Pin 25 first passes a gain control and a limiter stage. The maximum and the nominal frequency deviation of the following FM modulator is adjusted by means of the regulators 3210 and 3108.

The maximum, which is defined in the VHS standard, is 150 kHz.

The nominal frequency deviation is adjusted to 56 kHz.

The FM modulator consists of a current-controlled oscillator (CCO) requiring an external capacitor between Pin 31, 32. In addition to the value of the capacitor, the frequency of the oscillator is determined by the current flowing from Pin 42 to ground. This current, and therefore the frequency, can be adjusted by means of resistor 3104. The frequency for the left channel is 1,4 MHz, for the right channel 1,8 MHz. In the event of this current being changed, the frequency is changed. This current is changed via resistor 3105 in dependence on the input voltage. This change again causes a change of frequency (FM modulation). The FM signal is amplified and leaves the IC Pin 34.

2.2 FM Audio writing current:

The FM signals for the left and the right channel are mixted via the resistors 3003 and 3103. The mixture ratio is tuned to the frequency response of the FM Audio heads.

2.3 Playback:

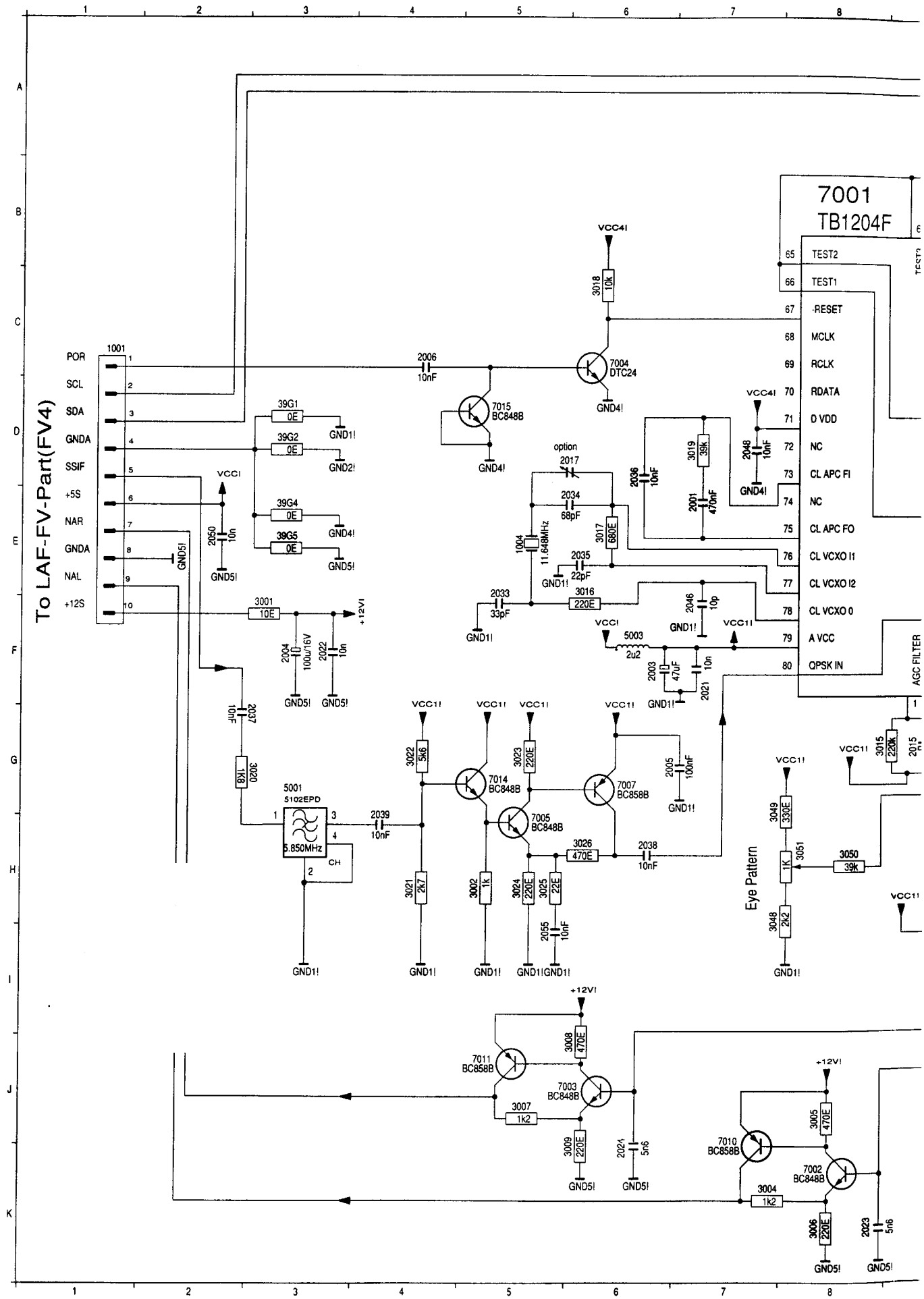
The FM signal is separated by the filter 1050 into the left and the right channel. If we now follow the right channel, we reach at Pin 38 the MODEM IC with the filtered 1,8 MHz signal.

In the IC, the FM signal is limited. The signal is now led to a phase monitor which compares the incoming signal with the reference frequency of the oscillator.

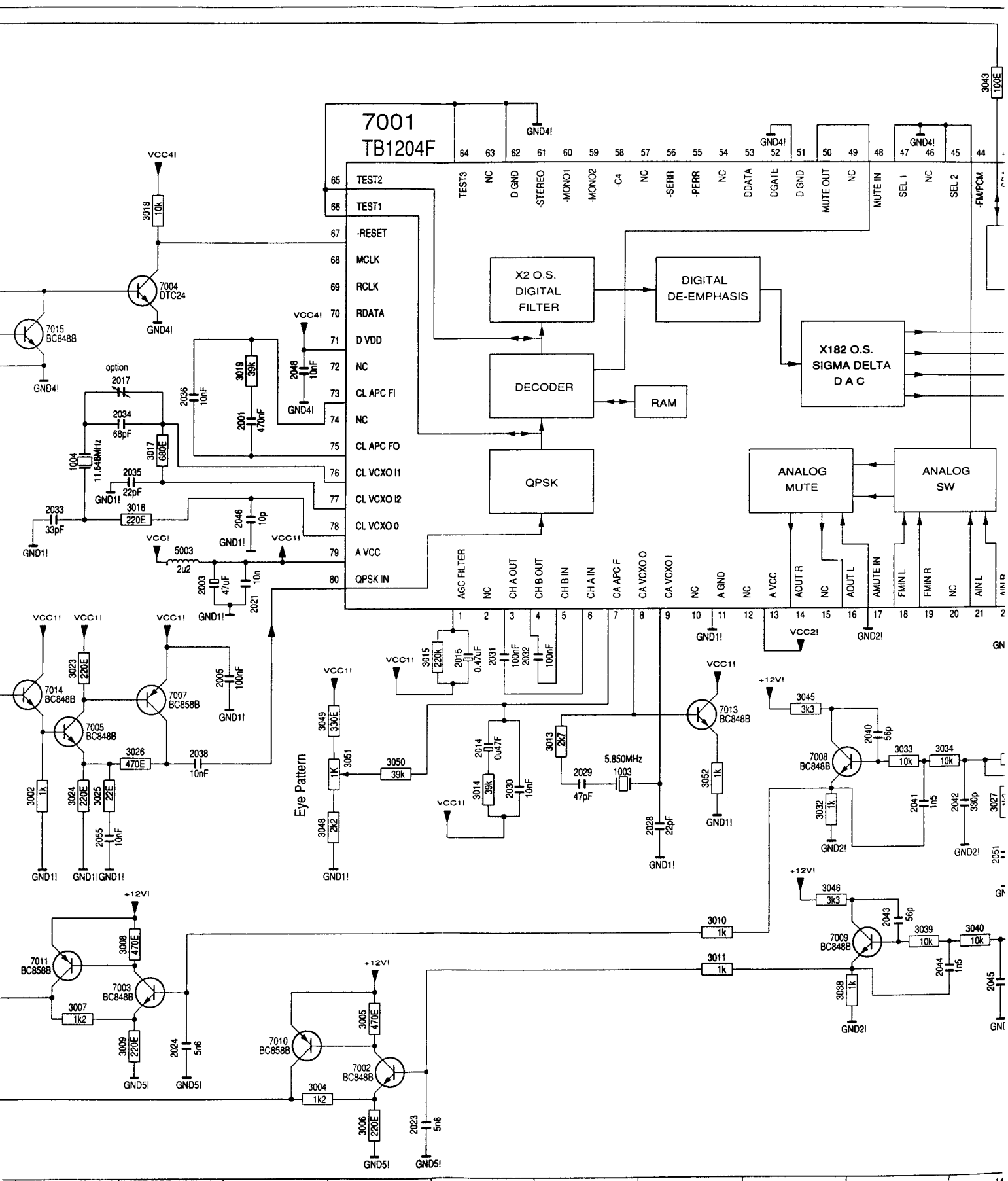
A control voltage is generated at the phase monitor, changing in dependence on the FM signal and corresponding to a PLL Demodulator. This control voltage corresponds to the Audio signal, is amplified and is led via Pin 29 to the regulator 3106. The playback amplitude is determined by means of this regulator. After Pin 28, the signal is amplified again and reaches the scanning and holding circuit. This circuit stores the level of the Audio signal in a capacitor, during the head change by HP2D (Pin 40). The demodulated signal leaves the MODEM IC via Pin 27.

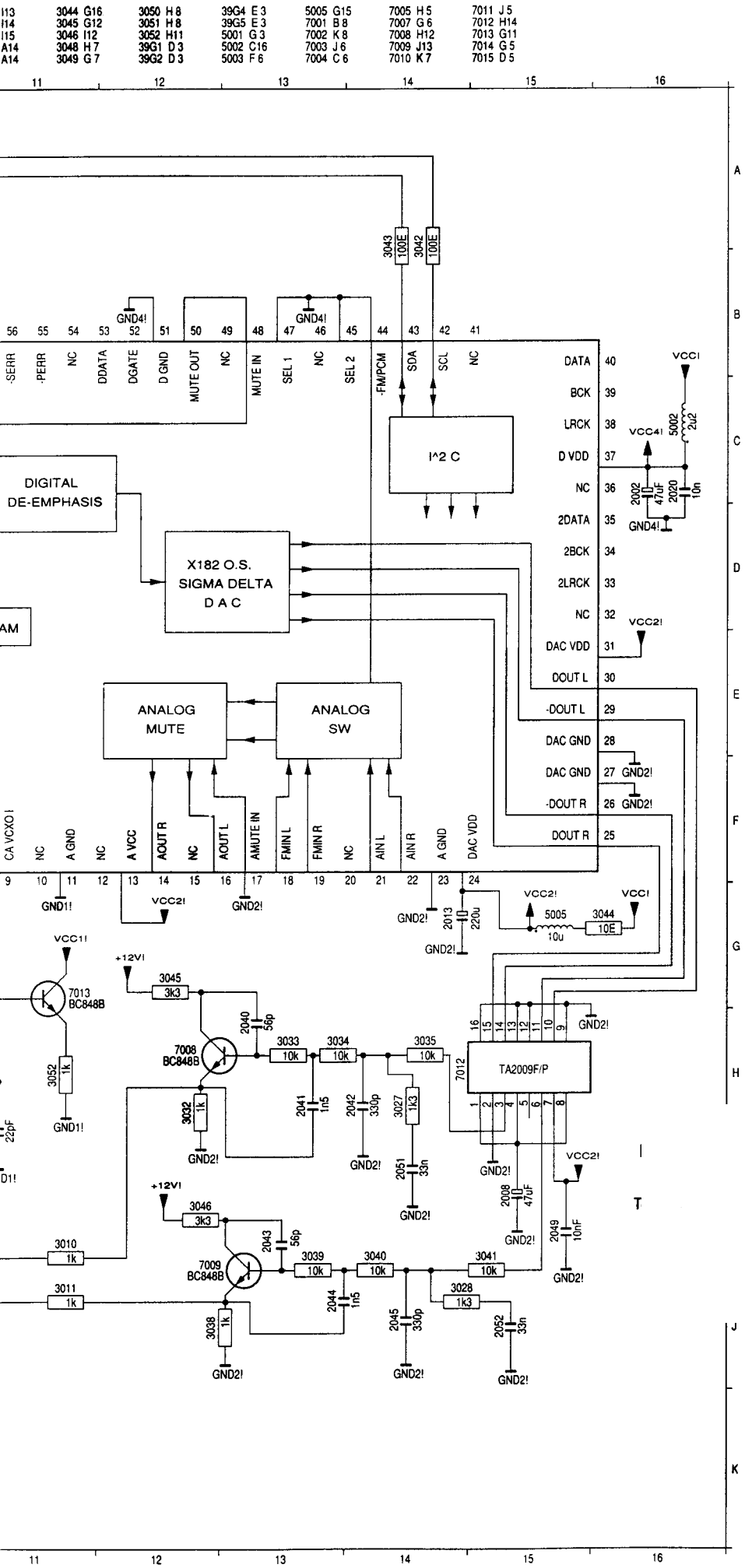
The processing for the left channel is analogous to the right channel.

1001 C 1	2003 F 6	2013 G14	2021 F 7	2029 H10	2034 E 6	2039 H 4	2044 J13	2050 E 2	3002 H 5	3008 J 6	3014 H 9	3019 D
1003 H10	2004 F 3	2014 H 9	2022 F 3	2030 H 9	2035 E 6	2040 H13	2045 J14	2051 I14	3004 K 7	3009 K 6	3015 G 8	3020 G
1004 E 5	2005 G 6	2015 G 9	2023 K 8	2031 G 9	2036 D 6	2041 H13	2046 F 7	2052 J15	3005 J 8	3010 I11	3016 E 6	3021 H
2001 E 7	2006 C 4	2017 D 6	2024 K 6	2032 G 9	2037 G 3	2042 H14	2048 D 7	2055 I 5	3006 K 8	3011 J11	3017 E 6	3022 G
2002 C16	2008 I15	2020 C16	2028 H11	2033 F 5	2038 H 6	2043 I13	2049 I15	3001 F 3	3007 J 5	3013 H10	3018 C 6	3023 G



2039 H 4 2040 H13 2041 H13 2042 H14 2043 I13
2044 J13 2045 J14 2046 F 7 2048 D 7 2049 I15
2050 E 2 2051 I14 2052 J15 2055 I 5 3001 F 3
3002 H 5 3004 K 7 3005 J 8 3006 K 8 3007 J 5
3008 J 6 3009 K 6 3010 I11 3011 J11 3013 H10
3014 H 9 3015 G 8 3016 E 6 3017 E 6 3018 C 6
3019 D 7 3020 G 3 3021 H 4 3022 G 4 3023 G 5
3024 H 5 3025 H 5 3026 H 6 3027 H14 3028 J14
3032 H12 3033 H13 3034 H13 3035 H14 3038 J12
3039 I13 3040 I14 3041 I15 3042 A14 3043 A14
3044 G16 3045 G12 3046 I12 3048 H 7 3049 G 7
3050 H 8 3051 H 8 3052 H11 39G1 D 3 39G2 D 3
39G4 E 3 39G5 E 3 5001 G 3 5002 C16 5003 F 6
5005 G15 7001 B 8 7002 K 8 7003 J 6 7004 C 6





Balancing the Nicam part LNIC (3051)

- Supply a Nicam modulated signal, connect channel 1 of an oscilloscope to Pin 5 of 7001; connect channel 2 to Pin 6.
- Set the oscilloscope to XY mode.
- Balance by means of 3051 until the picture at the oscilloscope is horizontal.

Abgleich des NICAM-Decoders LNIC (3051)

- Ein NICAM-moduliertes Signal zuführen
- Kanal 1 eines Oszilloskops an Pin 5 von 7001 anschließen; Kanal 2 an Pin 6
- Oszilloskop in den XY-Modus bringen
- Mit 3051 so abgleichen, daß das Bild am Oszilloskop gerade ist

Ajustage de la partie NICAM LNIC (3051)

- Appliquer un signal modulé NICAM; raccorder la voie 1 d'un oscilloscope au contact 5 de 7001, la voie 2 au contact 6.
- Amener l'oscilloscope en mode XY.
- Ajuster à l'aide de 3051 jusqu'à ce que l'image sur l'oscilloscope soit horizontale.

Vereffening van het Nicam-element LNIC (3051)

- Een NICAM-gemoduleerd signaal' toevoeren; kanaal 1 van een oscilloscoop op pin 5 van 7001 aansluiten; kanaal 2 op pin 6.
- Oscilloscoop in de XY-modus zetten.
- Met behulp van 3105 zodanig vereffenen dat het beeld op de oscilloscoop horizontaal is.

Compensatione della componente LNIC (3051)

- Portare un segnale modulato NICAM al canale 1 di un oscilloscopio e collegare sul Pin 5 di 7001; collegare il canale 2 sul Pin 4
- Portare l' oscilloscopio nella modalità XY
- Compensare 3051 in modo che l'immagine sull' oscilloscopio sia in orrizzontale

Ajuste de la parte NICAM LNIC (3031)

- Conducir una señal NICAM modulada al canal 1, conectar un osciloscopio a Pin 5 de 7001; canal 2 al Pin 6.
- Llevar el osciloscopio a la modalidad XY.
- Ajustar con 3051 de tal manera que la imagen en el osciloscopio sea horizontal.

Balancing the Nicam part LNIC (3051)
- Supply a Nicam modulated signal, connect channel 1 of an oscilloscope to Pin 5 of 7001; connect channel 2 to Pin 6.
- Set the oscilloscope to XY mode.
- Balance by means of 3051 until the picture at the oscilloscope is horizontal.

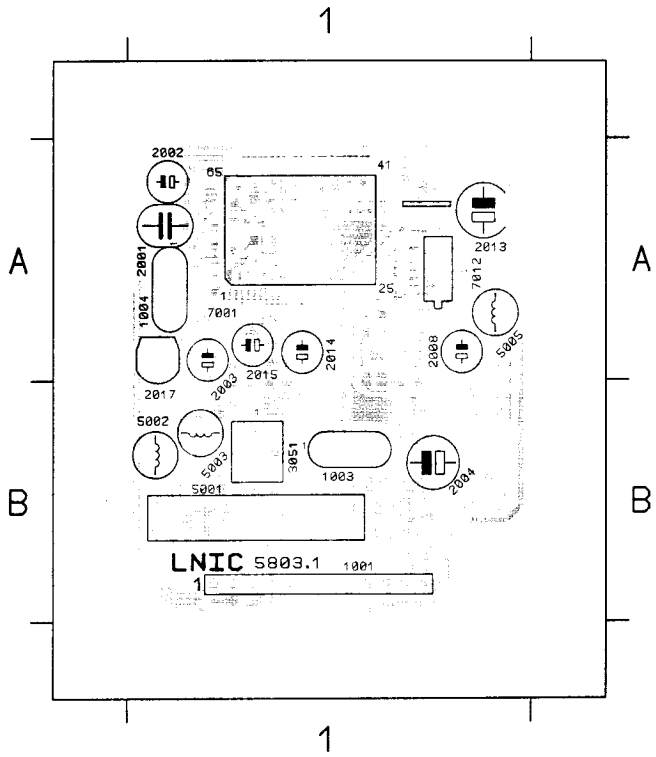
Abgleich des NICAM-Decoders LNIC (3051)
- Ein NICAM-moduliertes Signal zuführen
- Kanal 1 eines Oszilloskops an Pin 5 von 7001 anschließen; Kanal 2 an Pin 6
- Oszilloskop in den XY-Modus bringen
- Mit 3051 so abgleichen, daß das Bild am Oszilloskop gerade ist

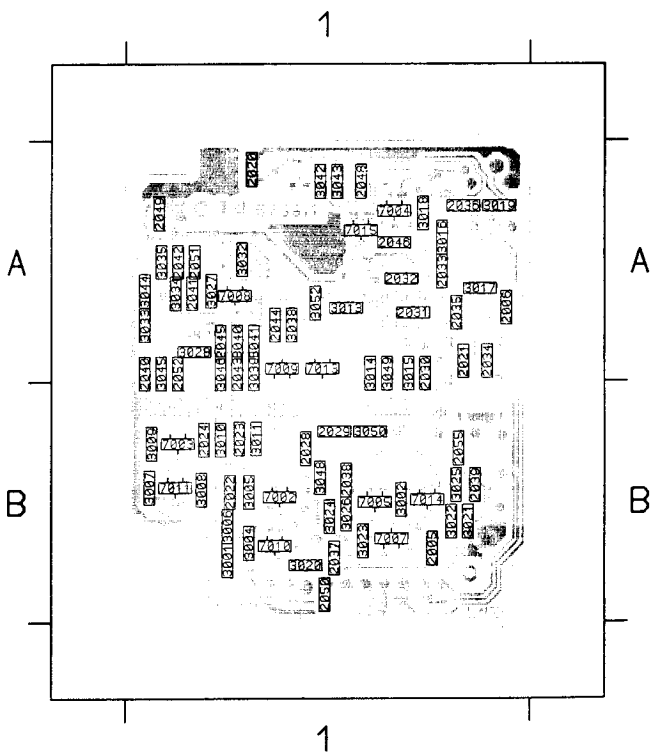
Ajustage de la partie NICAM LNIC (3051)
- Appliquer un signal modulé NICAM; raccorder la voie 1 d'un oscilloscope au contact 5 de 7001, la voie 2 au contact 6.
- Amener l'oscilloscope en mode XY.
- Ajuster à l'aide de 3051 jusqu'à ce que l'image sur l'oscilloscope soit horizontale.

Vereffening van het Nicam-element LNIC (3051)
- Een NICAM-gemoduleerd signaal' toevoeren; kanaal 1 van een oscilloscoop op pin 5 van 7001 aansluiten; kanaal 2 op pin 6.
- Oscilloscoop in de XY-modus zetten.
- Met behulp van 3105 zodanig vereffenen dat het beeld op de oscilloscoop horizontaal is.

Compensatione della componente LNIC (3051)
- Portare un segnale modulato NICAM al canale 1 di un oscilloscopio e collegare sul Pin 5 di 7001; collegare il canale 2 sul Pin 4
- Portare l' oscilloscopio nella modalità XY
- Compensare 3051 in modo che l'immagine sull' oscilloscopio sia in orrizzontale

Ajuste de la parte NICAM LNIC (3031)
- Conducir una señal NICAM modulada al canal 1, conectar un osciloscopio a Pin 5 de 7001; canal 2 al Pin 6.
- Llevar el osciloscopio a la modalidad XY.
- Ajustar con 3051 de tal manera que la imagen en el osciloscopio sea horizontal.





OPERATING PANEL LDC

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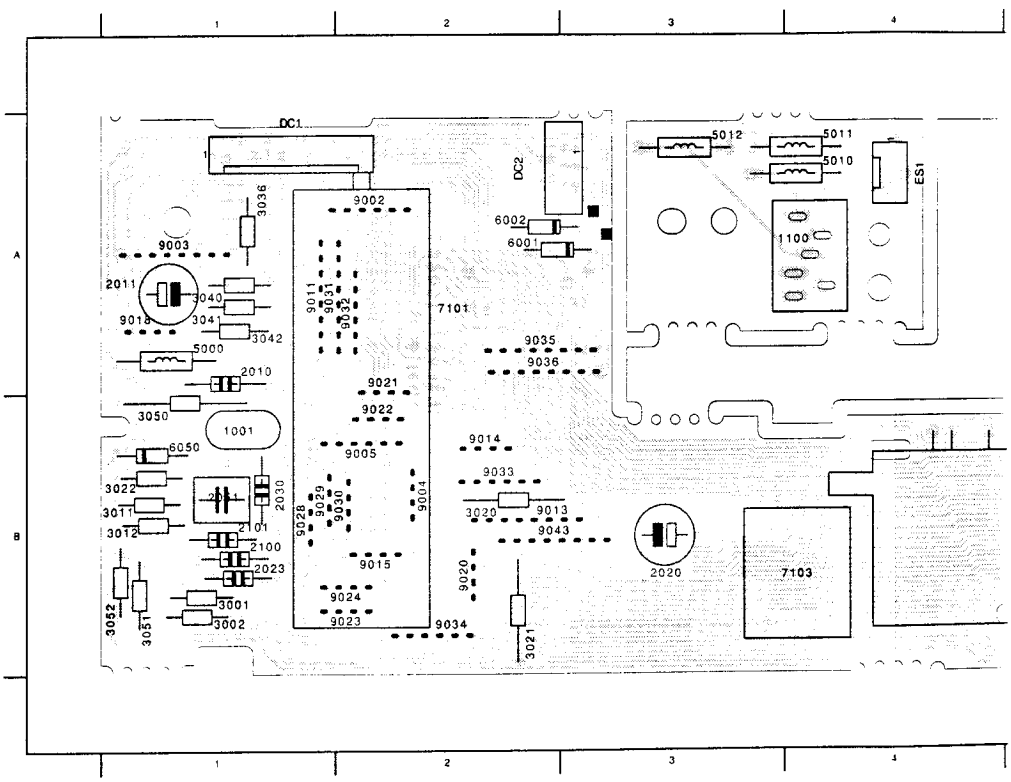
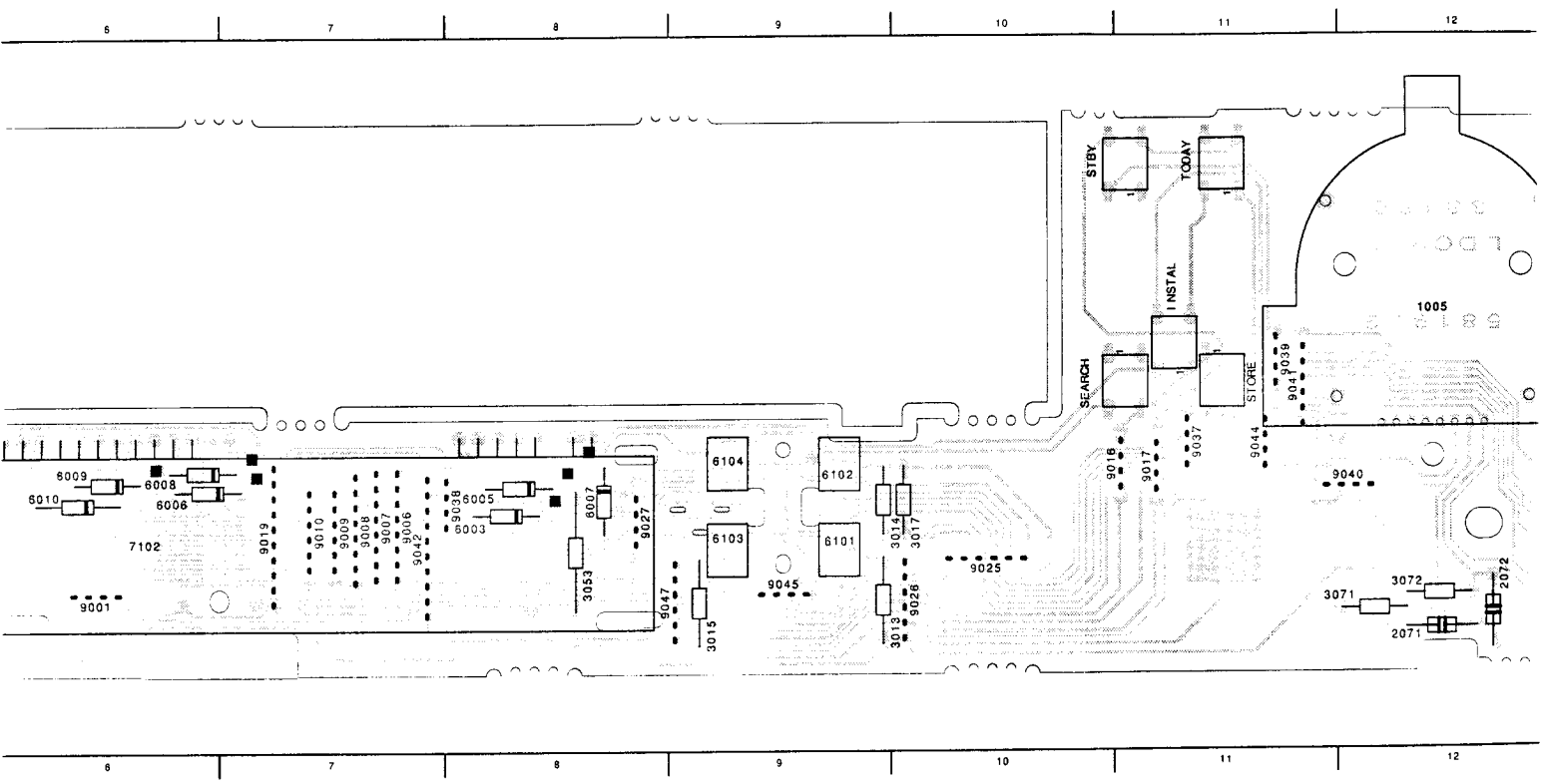
1005 B 12	2011 A 1	2030 B 1	2072 B 12	3001 B 1	3012 B 1	3015 B 9	3021 B 2	3040 A 1	3050 B 1	3053 B 8	5000 A 1	50
1100 A 4	2020 B 3	2051 B 1	2100 B 1	3002 B 1	3013 B 9	3017 B 10	3022 B 1	3041 A 1	3051 B 1	3071 B 12	5010 A 3	60



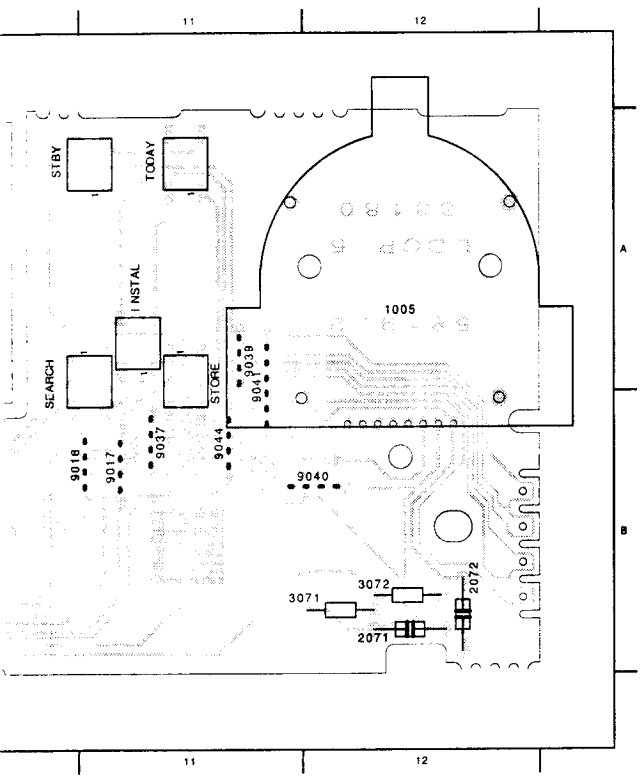
| | | |

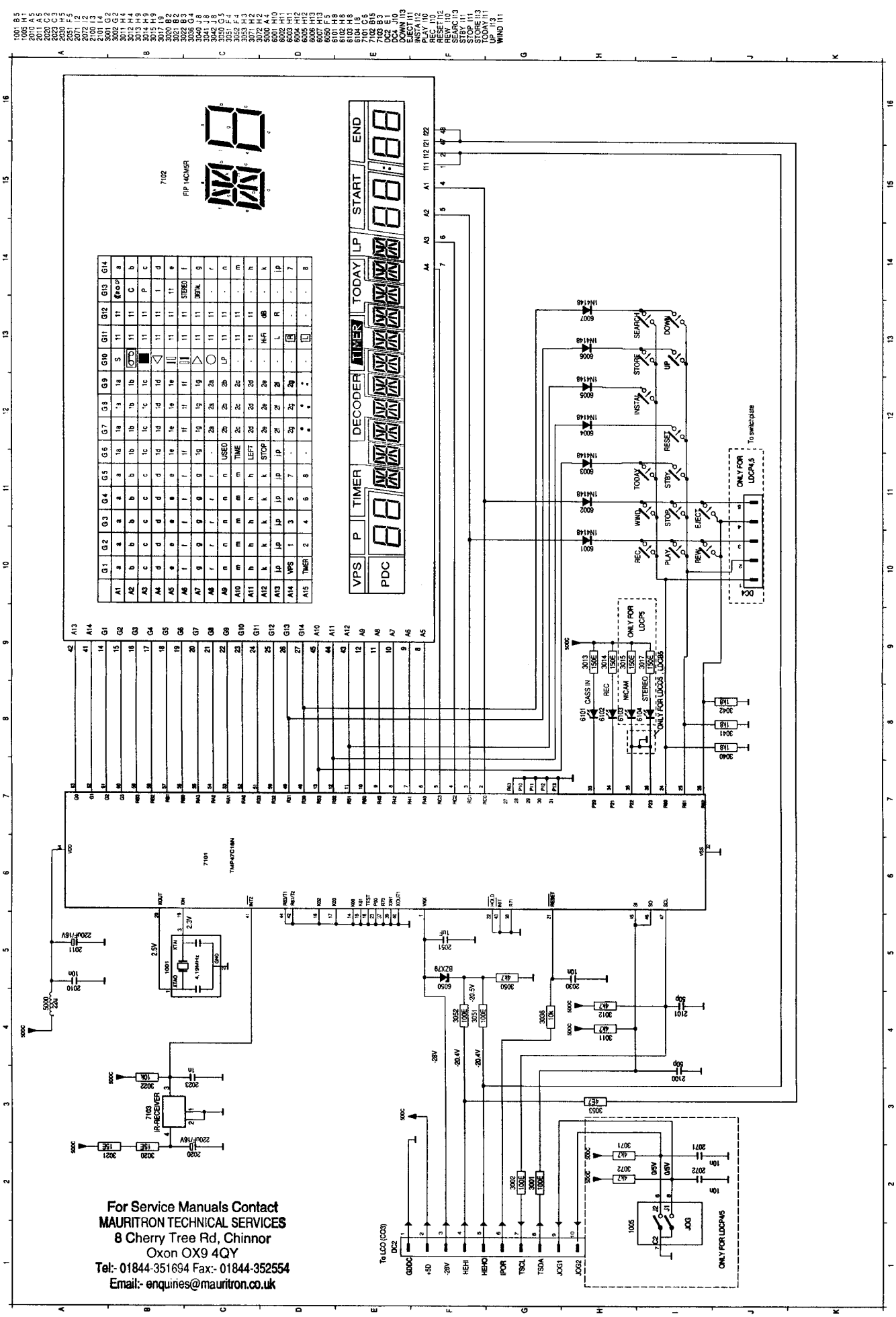
3-32

6009 B 6	6101 B 9	6104 B 9	7103 B 4	9003 A 1	9006 B 7	9009 B 7	9012 B 5	9015 B 2	9018 A 1	9021 A 2	9024 B 2	9027 B 8	9030 B 2	9033 B 2	9036 A 2	9039 A 11	9042 B 7	9045 B 9	
6010 B 6	6102 B 9	7101 A 1	9001 B 6	9004 B 2	9007 B 7	9010 B 7	9013 B 3	9016 B 11	9019 B 7	9022 B 2	9025 B 10	9028 B 1	9031 A 2	9034 B 2	9037 B 11	9040 B 11	9043 B 2	9047 B 9	
6050 B 1	6103 B 9	7102 B 4	9002 A 1	9005 B 2	9008 B 7	9011 A 1	9014 B 2	9017 B 11	9020 B 2	9023 B 2	9026 B 10	9029 B 1	9032 A 2	9035 A 2	9038 B 8	9041 B 11	9044 B 11	DC1 A 1		



9030	B	2	9033	B	2	9036	A	2	9039	A	11
9031	A	2	9034	B	2	9037	B	11	9040	B	11
9032	A	2	9035	A	2	9038	B	8	9041	B	11
9042	B	7	9045	B	9	DC2	A	3			
9043	B	2	9047	B	9	ES1	A	4			
9044	B	11	DC1	A	1						




VPS
P
TIMER
DECODER
TIMER
TODAY
LP
START
END
PDC
7102
FIP 14CM5R
7101
TMP87C788N
7103
IR-RECEIVER
4.194MHz
For Service Manuals Contact
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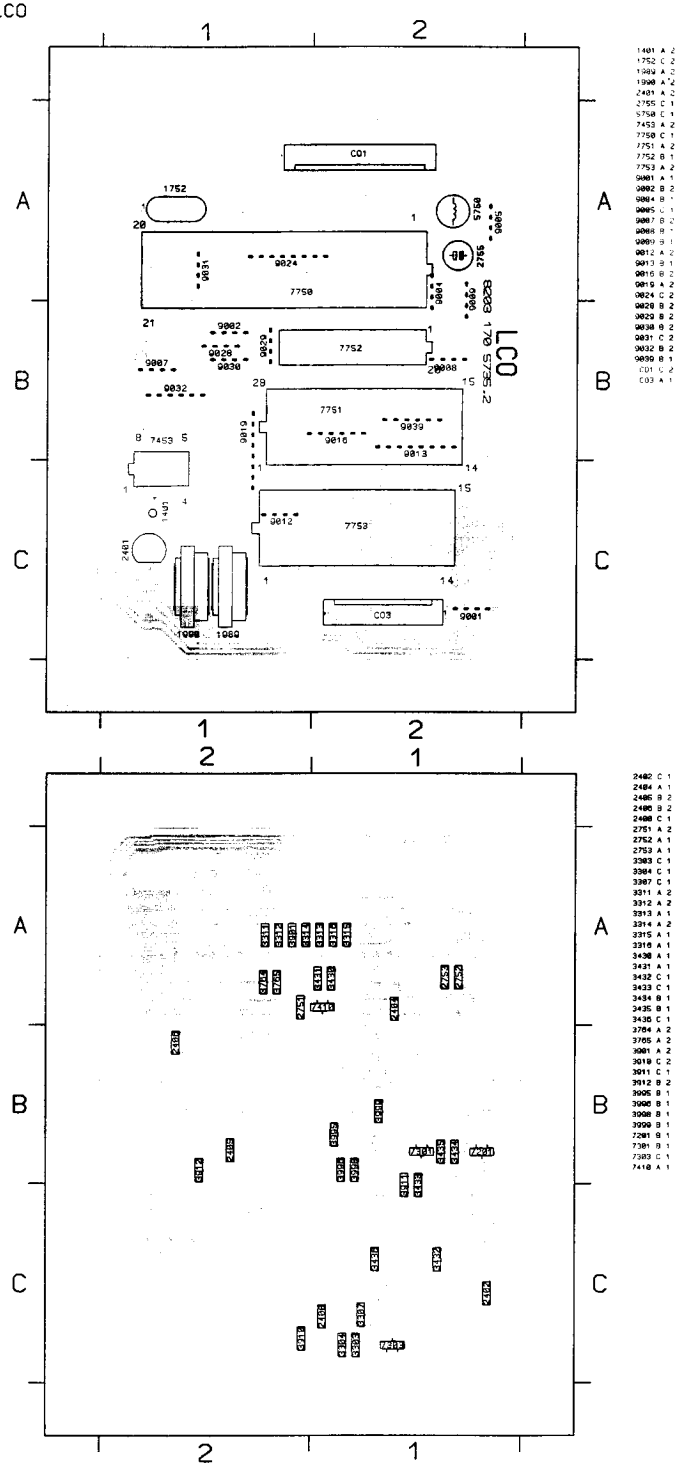


Settings of the LCO

1. Setting of the "timer clock" frequency (2401)
- Connect a frequency meter to the connection 2 of IC 7453 by means of an FET sample
- Set 2401 so that the frequency is 32,768 kHz ± 0,12 Hz

Einstellungen am LCO

1. Einstellung der "timer-clock"-Frequenz (2401)
- einen Frequenzmesser mittels eines FET-Tastkopfes an Anschluß 2 von IC 7453 schalten
- 2401 so einstellen, daß die Frequenz 32,768kHz ± 0,12 Hz beträgt

Ajustages sur la LCO

1. Réglage de la fréquence du "TIMER-CLOCK" (2401)
- brancher un fréquencemètre au moyen d'une sonde effet de champ sur la connection 2 de l'IC7453
- régler 2401 de telle façon que la fréquence s'élèveNRà 32,768kHz ± 0,12Hz

Instellingen op de LCO

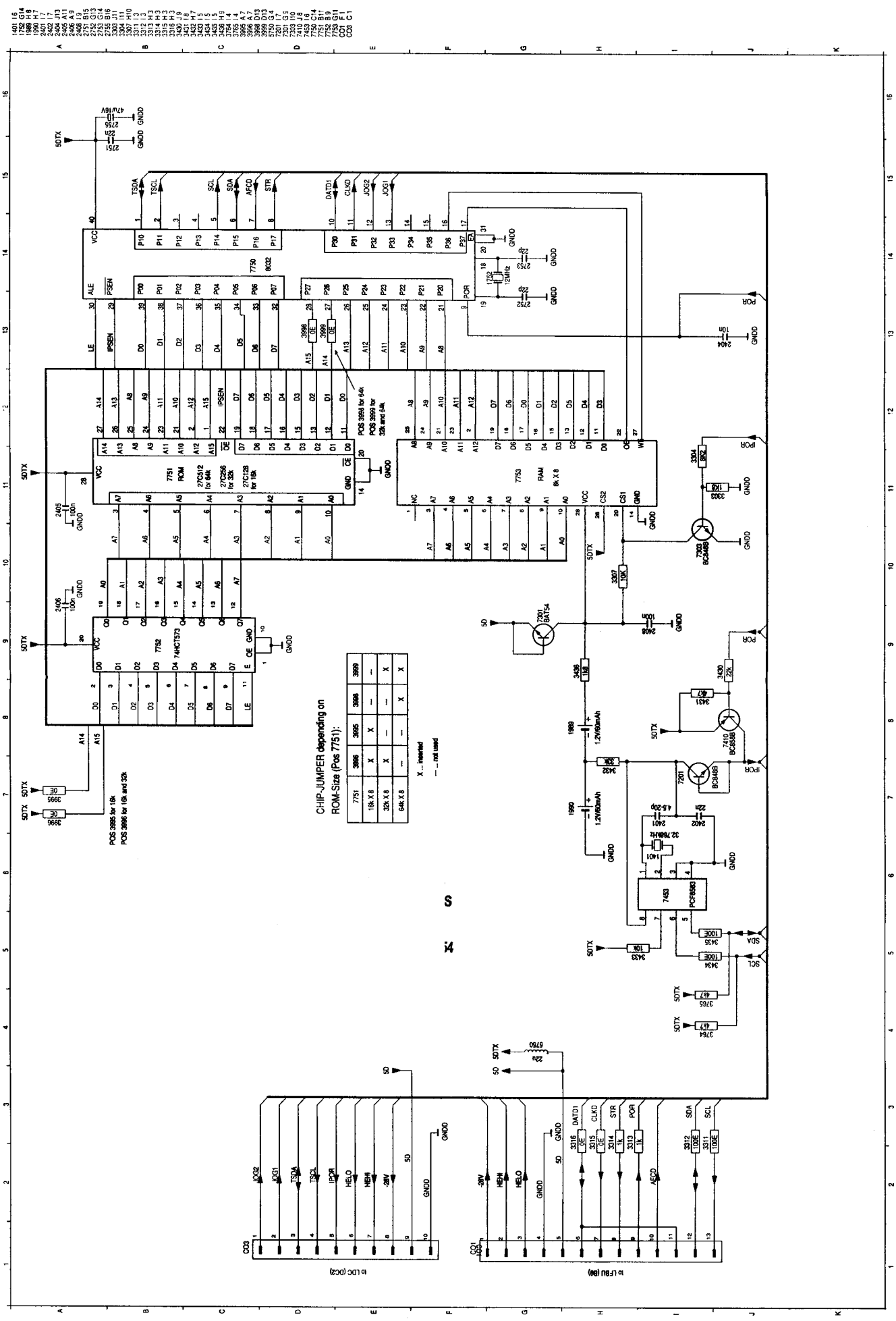
1. Instelling van de "timer-clock"-frequentie (2401)
- een frequentiemeter via een FET-testpen op aansluiting 2 van IC 7453 aansluiten
- 2401 zodanig instellen dat de frequentie 32,768kHz ± 0,12 Hz bedraagt

Ajustes del LCO

1. Regulación de la frecuencia del "timer-clock" (reloj contador) (2401)
- Conectar un medidor de frecuencia, por medio de una sonda de prueba FET a la conexión 2 del IC 7453
- Regular el 2401 de forma que la frecuencia sea de32,768kHz ± 0,12 Hz

Regolazioni al LCO

1. Regolazione della frequenza d'orologio (2401)
- collegare un frequenzimetro a Pin 2 di IC 7453 con l'aiuto di un separatore FET



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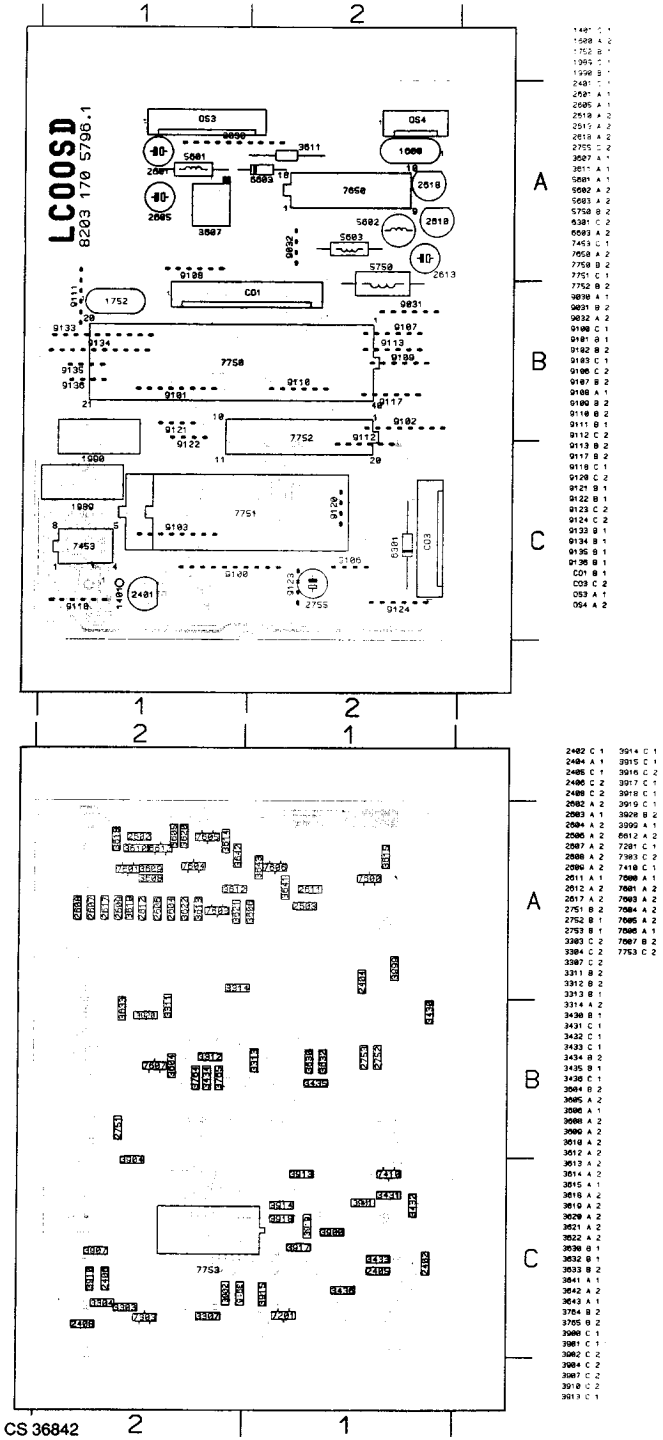
CONTROL BOARD LCO

Control board OSD LCOOSD



Settings of the LCOOSD

1. Setting of the "timer clock" frequency (2401)
- Connect a frequency meter to the connection 2 of IC 7453 by means of an FET sample
- Set 2401 so that the frequency is 32,768 kHz ± 0,12 Hz

Setting of the OSD-part
2.1 Setting of the writing position (2610)
- Connect a circle test pattern to the aerial input
- Put the unit in position "STOP" and press "OSD" key onremote control
- Adjust writing with 2610 so that the margin is the samet the left and right edge of the screen.

2.2 Setting the video output level (3607)
- No signal at the aerial input
- Terminate video output at the Scart jack with 75 Ω
- Press "TIMER" key
- Set the video signal at the Scart jack to 0.85 V with 3607 with the aid of the oscilloscope

2.3 Setting the chroma auxiliary carrier (2618)
- Connect a frequency meter to connection 11 of IC 7650 by means of an FET sample
- et 2618 so that the frequency is 17.7345 MHz ± 100 Hz

Einstellungen am LCOOSD

1. Einstellung der "timer-clock"-Frequenz (2401)
- einen Frequenzmesser mittels eines FET-Tastkopfes an Anschluß 2 von IC 7453 schalten
- 2401 so einstellen, daß die Frequenz 32,768kHz ± 0,12 Hz beträgt

Einstellungen für den OSD Teil
2.1 Einstellung der Schriftposition (2610)
- Kreistestbild am Antenneneingang einspeisen
- Gerät in "STOP" Position bringen und "OSD" Taste auf der Fernbedienung drücken
- mit 2610 die Schrift so einstellen, daß am linken und rechten Bildschirmrand der gleiche Abstand ist.

2.2 Einstellung des Video-Ausgangspegels (3607)
- kein Signal am Antenneneingang
- Videoausgang an der Scartbuchse mit 75 Ω abschließen "TIMER" Taste drücken
- mit 3607 das Videosignal an der Scartbuchse auf 0,85 V mit dem Oszilloskop einstellen

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2.3 Einstellung des Chroma-Hilfsträgers (2618)
- einen Frequenzmesser mittels einer FET-Tastkopf an Anschluß 11 von IC 7650 schalten
- 2618 so einstellen, daß die Frequenz 17,7345MHz ± 100Hz beträgt

Ajustages sur la LCOOSD

1. Réglage de la fréquence du "TIMER-CLOCK" (2401)
- brancher un fréquencemètre au moyen d'une sonde effet de champ sur la connection 2 de l'IC7453
- régler 2401 de telle façon que la fréquence s'élèveNRà 32,768kHz ± 0,12Hz

Ajustages pour la partie OSD
2.1 Réglage de la position affichage écran (2610)
- appliquer une mire de test sur l'entrée d'antenne
- mettre l'appareil sur la position "STOP" et appuyer sur la touche "OSD" de la télécommande
- régler l'affichage écran de telle façon qu'il y ait le même espacement sur le bord droit et sur le bord gauche de l'écran, à l'aide de 2610

2.2 Réglage du signal de sortie vidéo (3607)
- ne pas appliquer de signal sur l'entrée d'antenne
- relier la sortie image à la prise SCART avec 75 Ω appuyer sur la touche "TIMER"
- au moyen de 3607, ajuster le signal vidéo sur la prise SCART à 0,85 V (avec l'oscilloscope)

2.3 Réglage du courant porteur auxiliaire Chroma (2618)
- brancher un fréquencemètre au moyen d'une sonde
- effet de champ sur le point 11 de l'IC7650
- régler 2618 de façon que la fréquence s'élève à 17,7345 MHz ± 100Hz

Instellingen op de LCOOSD

1. Instelling van de "timer-clock"-frequentie (2401)
- een frequentiemeter via een FET-testpen op aansluiting 2 van IC 7453 aansluiten
- 2401 zodanig instellen dat de frequentie 32,768kHz ± 0,12 Hz bedraagt

Instellingen or het OSD-gedeelte
2.1 Instelling van de tekstpositie (2610)
- cirkelvormig testbeeld aan de antenne-ingang ingeven
- toestel op "STOP" schakelen en de "OSD"-toets op de afstandsbediening indrukken
- met behulp van 2610 de tekst zodanig instellen dat aan de linker en rechter beeldschermrand dezelfde afstand is

2.2 Instelling van het video-uitgangsniveau (3607)
- geen signaal aan de antenne-ingang
- video-uitgang aan de scartaansluiting met 75 Ω afsluiten"TIMER"-toets indrukken
- d.m.v. 3607 het videosignaal aan de scartaansluiting op 0,85 V instellen gemeten met de oscilloscoop

2.3 Instelling van de Chroma-hulpdraaggolf (2618)
- een frequentiemeter via een fet-testpen op aansluiting 11 van IC 7650 aansluiten
- 2618 zodanig instellen dat de frequentie 17,7345MHz ± 100 Hz bedraagt

Regolazioni al LCOOSD
1. Regolazione della frequenza d'orologio (2401)
- collegare un frequenzimetro a Pin 2 di IC 7453 con l'aiuto di un separatore FET
- regolare 2401 in modo che la frequenza sia 32,768kHz ± 0,12 Hz

Regolazioni per la parte OSD
2.1 Regolazione della posizione di scrittura (2610)
- applicare un segnale test con cerchio all'entrata d'antenna
- portare l'apparecchio in posizione "STOP" e premere il tasto "OSD" sul telecomando
- regolare la scrittura con 2610 in modo che i margini destro e sinistro dello schermo abbiano la stessa distanza

2.2 Regolazione del livello d'uscita video (3607)
- non applicare nessun segnale all'entrata d'antenna
- chiudere l'uscita video alla presa Euro con 75 Ω premere il tasto "TIMER"
- regolare con 3607 il segnale video alla presa Euro a 0,85 V misurati con l'oscilloscopio

2.3 Regolazione della portante ausiliaria croma (2618)
- collegare tramite un separatore FET un frequenzimetro a Pin 11 di IC 7650
- regolare 2618 in modo che la frequenza sia 17,7345MHz ± 100 Hz

Ajustes del LCOOSD

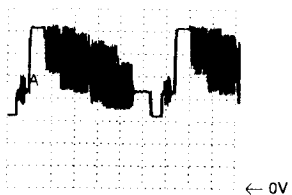
1. Regulación de la frecuencia del "timer-clock" (reloj contador) (2401)
- Conectar un medidor de frecuencia, por medio de una sonda de prueba FET a la conexión 2 del IC 7453
- Regular el 2401 de forma que la frecuencia sea de32,768 kHz ± 0,12 Hz

Ajustes del circuito OSD
2.1 Regulación de la posición de escritura (2610)
- Enviar una imagen de círculo de prueba a la entrada de antena
- Colocar el aparato en posición de "STOP" y oprimir la tecla "OSD" del mando a distancia
- Con el 2610 regular la escritura de forma que quede el mismo margen en el lado derecho e izquierdo de la pantalla

2.2 Regulación del nivel de salida de video (3607)
- Ninguna señal en la entrada de antena
- Terminar la salida de video en el conector "Scart" con 75 Ω Oprimir la tecla de "TIMER"
- Con 3607, regular la señal de video en el conector a 0,85 V con el osciloscopio.

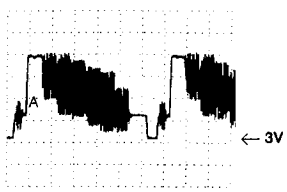
2.3 Regulación de la portadora auxiliar de croma (2618)
- Conectar un medidor de frecuencia mediante una sonda de prueba FET a la conexión 11 de IC 7650
- Regular el 2618 de forma que la frecuencia sea de 17,7345 MHz ± 100 Hz

A: DC, 0.5 V/Div, 10 us/Div



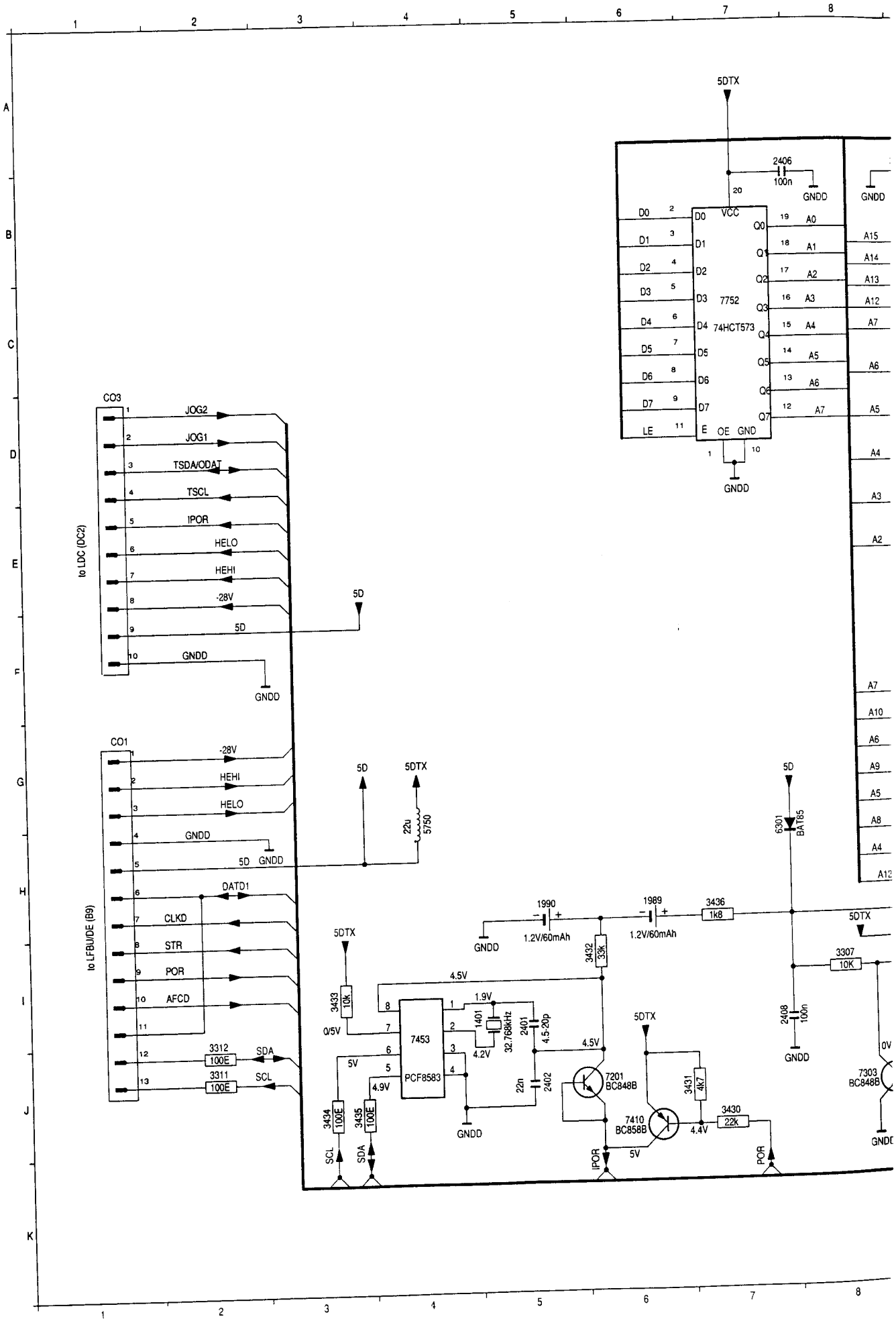
Osc 14
3OS3 VSB

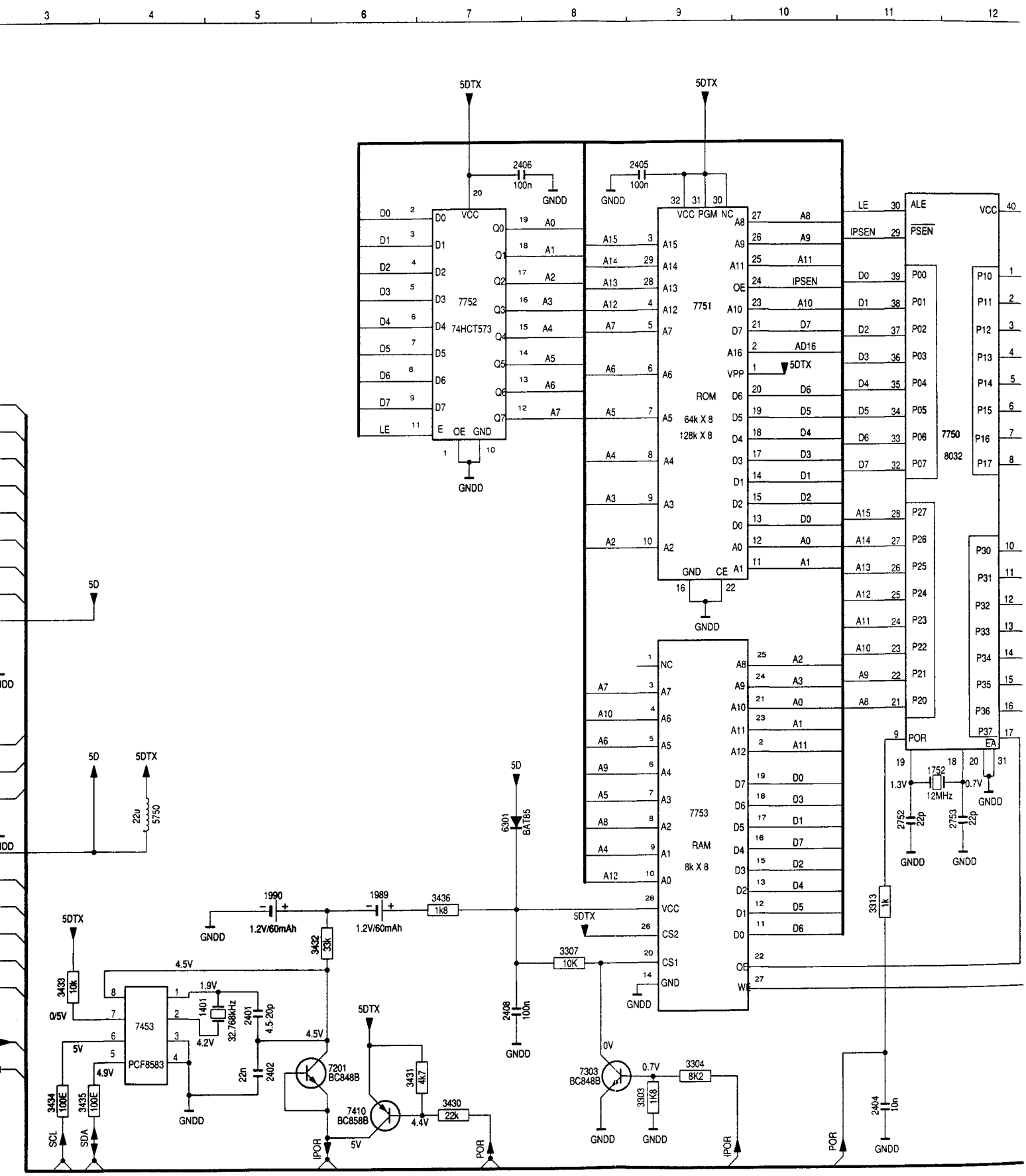
A: AC, 0.5 V/Div, 10 us/Div

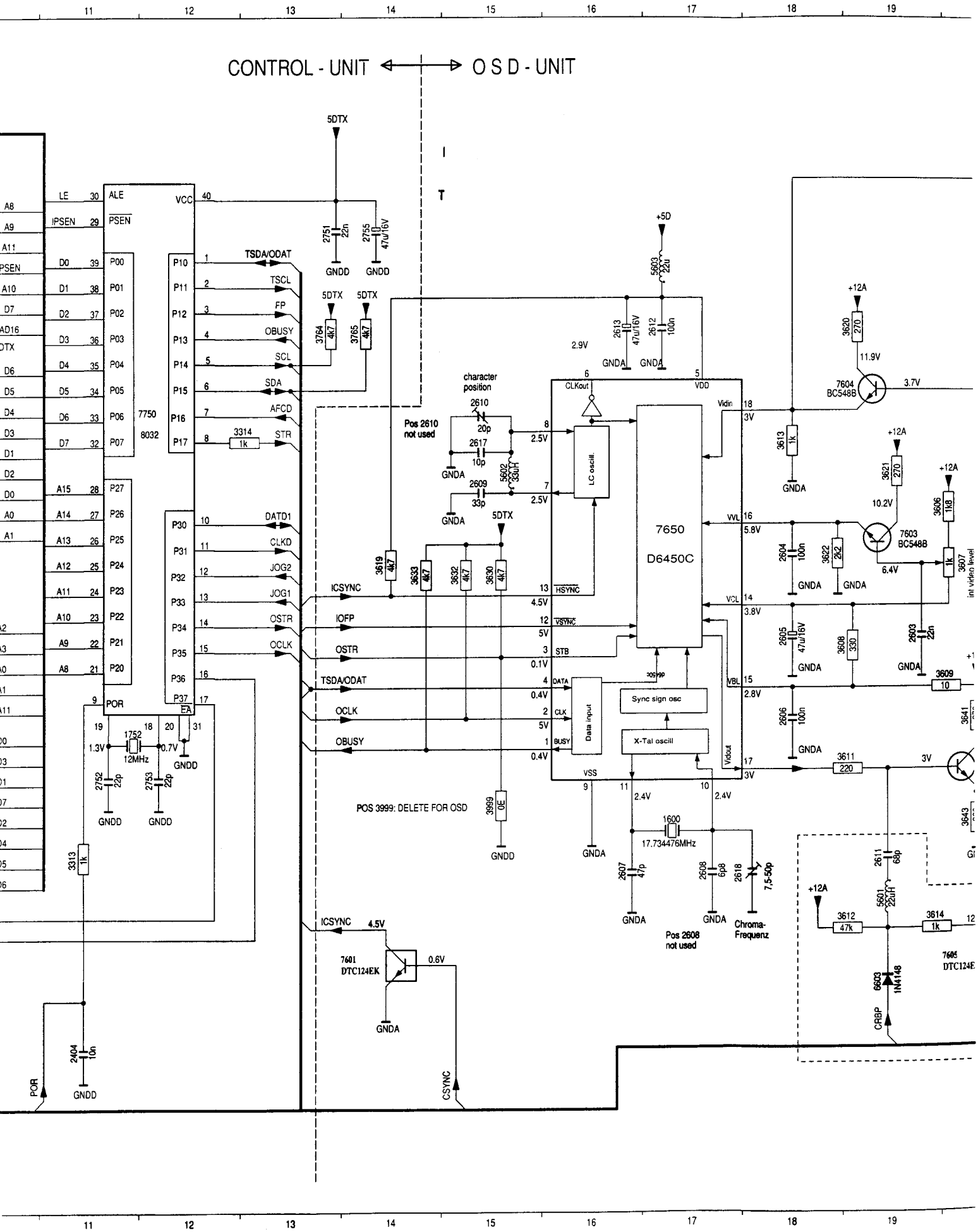


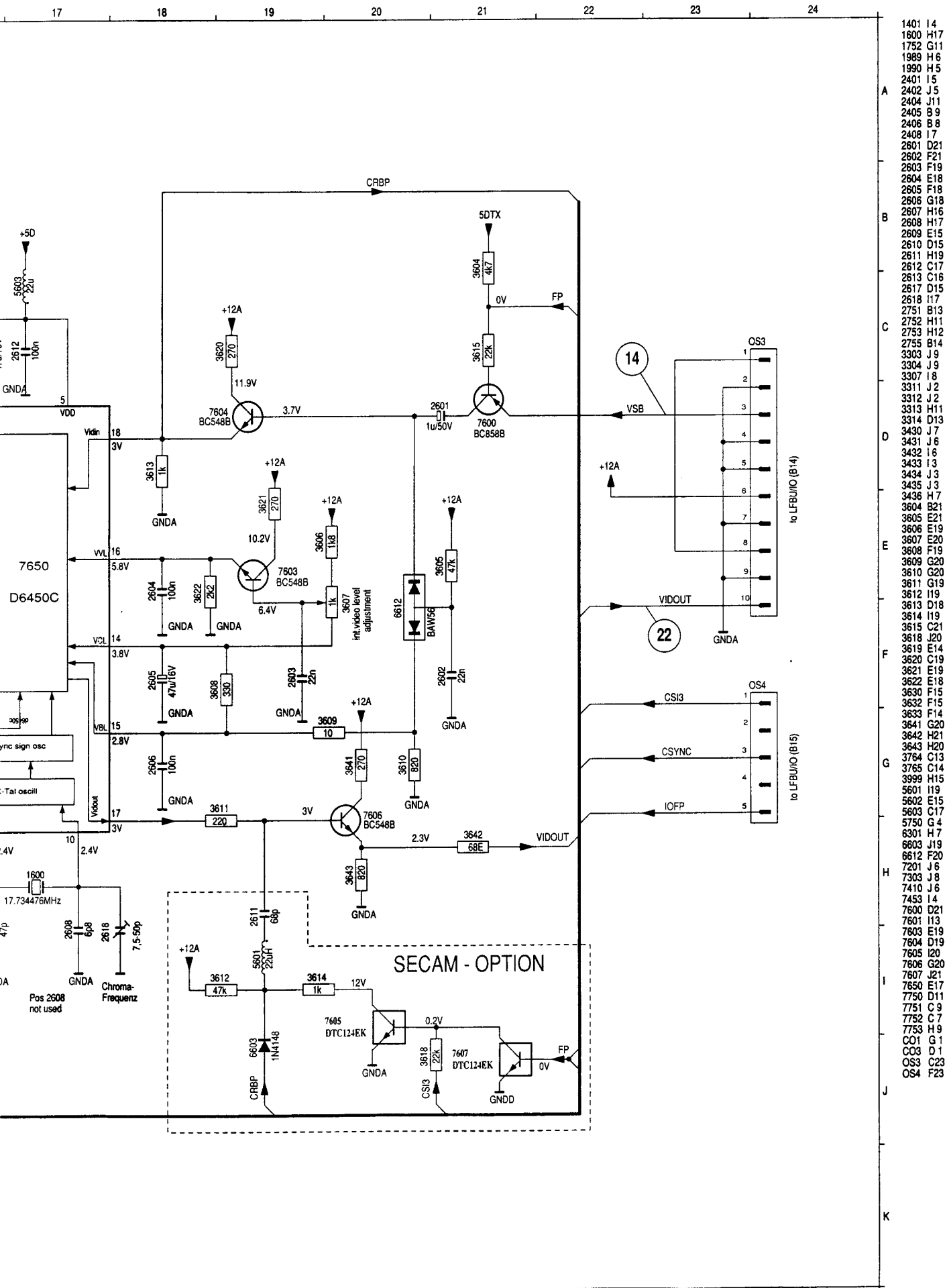
Osc 81
10OS3 VIDOUT

CONTROL BOARD OSD LCOOSD



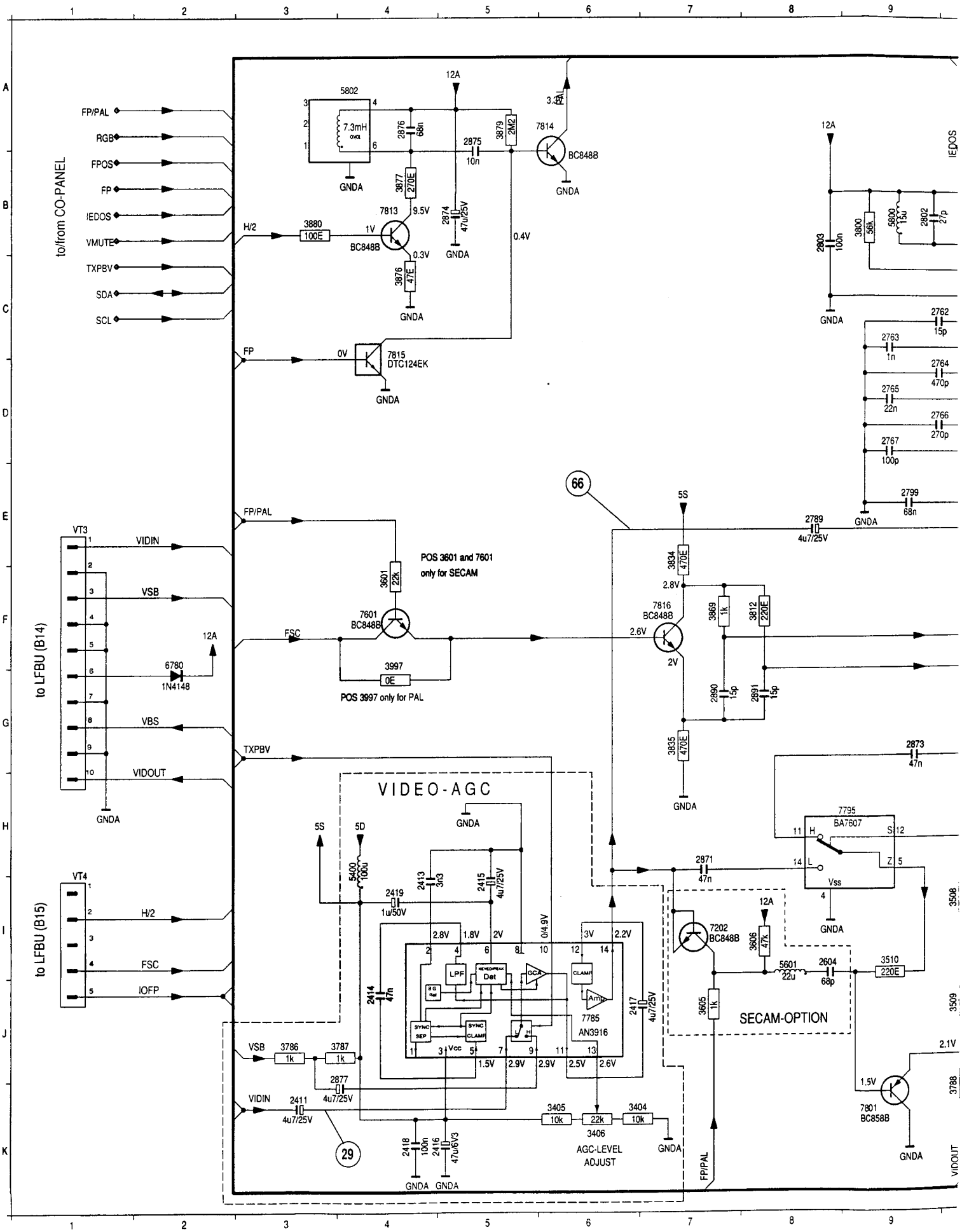

5DTX
2406
100n
GNDD
7752
74HCT573
2405
7751
ROM
64k X 8
128k X 8
7753
RAM
8k X 8
7750
8032
ALE
PSEN
IPSEN
5D
22u
5750
6301
BAT85
1990
1989
1.2V/60mAh
3436
1k8
3432
33k
3307
10K
2408
100n
3313
1k
1752
12MHz
2752
22p
2753
22p
0.7V
1.3V
EA
POR
3433
10k
0/5V
7453
PCF8583
1401
32.768kHz
2401
4.5-20p
2402
22n
4.5V
1.9V
4.2V
5V
4.9V
3434
100E
3435
100E
SCL
SDA
7201
BC848B
7410
BC858B
3431
4k7
3430
22k
4.4V
IPOR
7303
BC848B
3304
8K2
3303
1K8
2404
10n

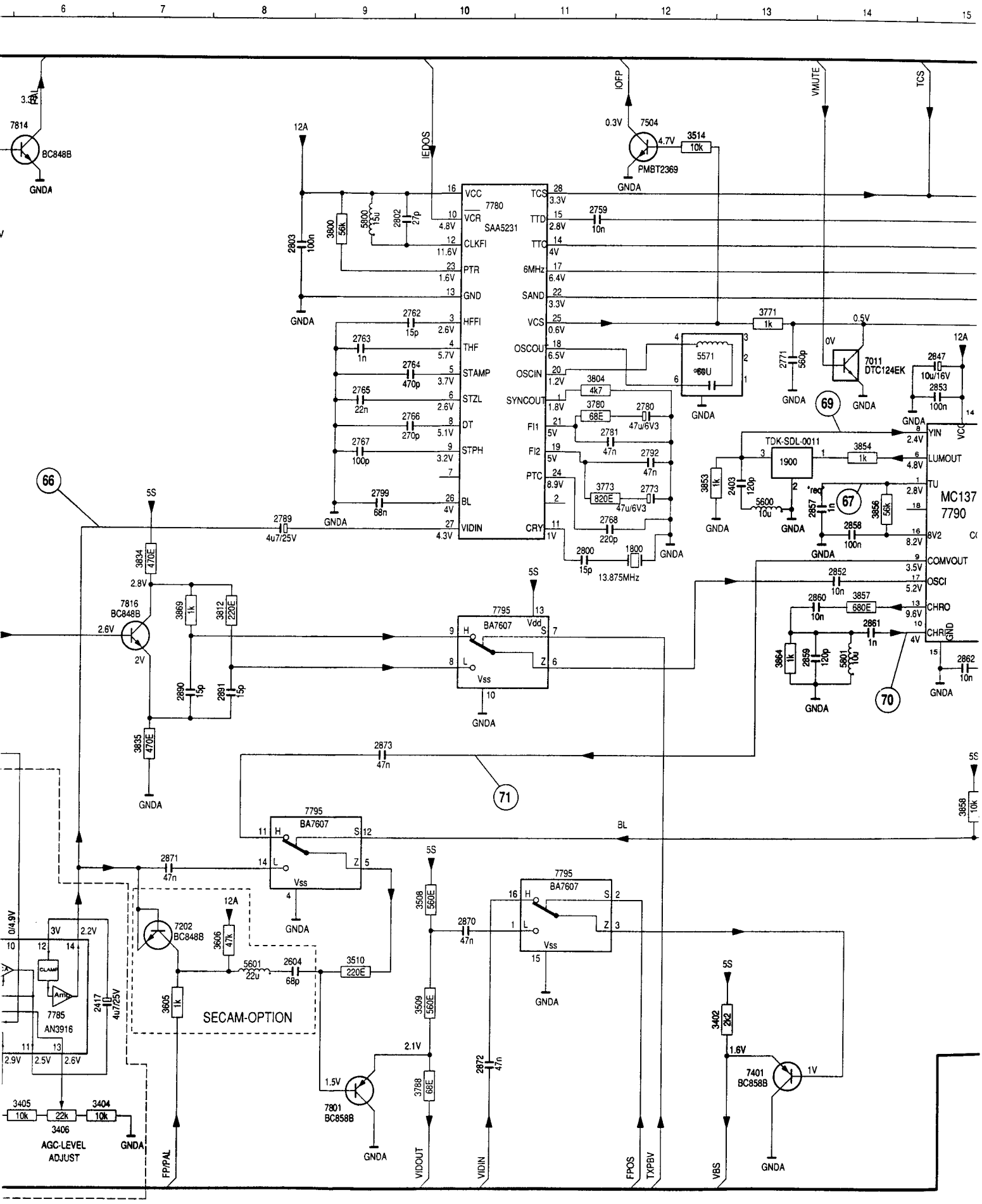

CONTROL - UNIT
O S D - UNIT
7650
D6450C
7750
8032
LC oscill.
Data input
Sync sign osc
X-Tal oscill
POS 3999: DELETE FOR OSD
Pos 2610 not used
Pos 2608 not used
Chroma-Frequenz
TSDA/ODAT
TSCL
FP
OBUSY
SCL
SDA
AFCD
STR
DATD1
CLKD
JOG2
JOG1
OSTR
OCLK
ICSYNC
IOFP
POR
CSYNC
12MHz
17.734476MHz
7601 DTC124EK
7603 BC548B
7604 BC548B
7605 DTC124E
1N4148

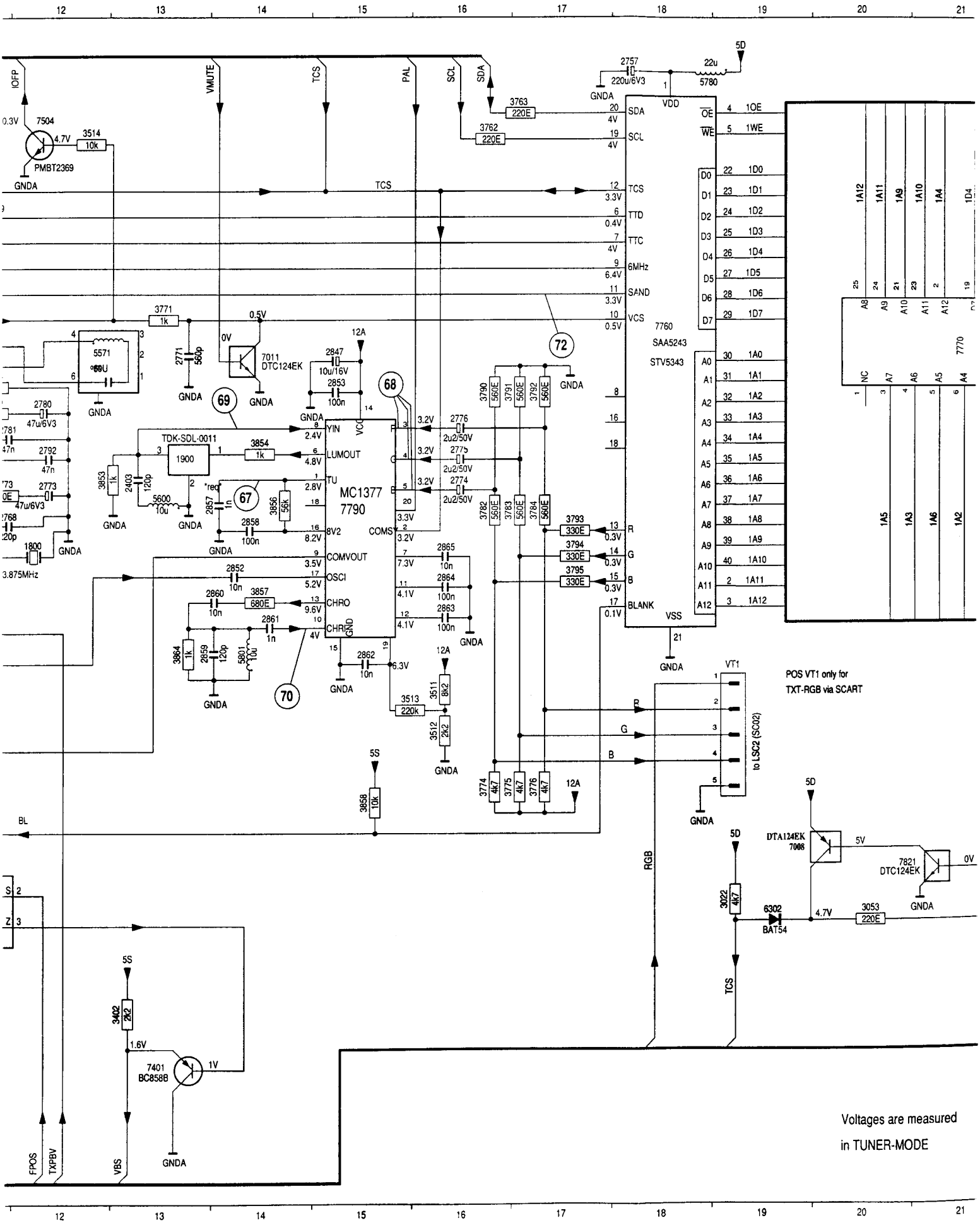


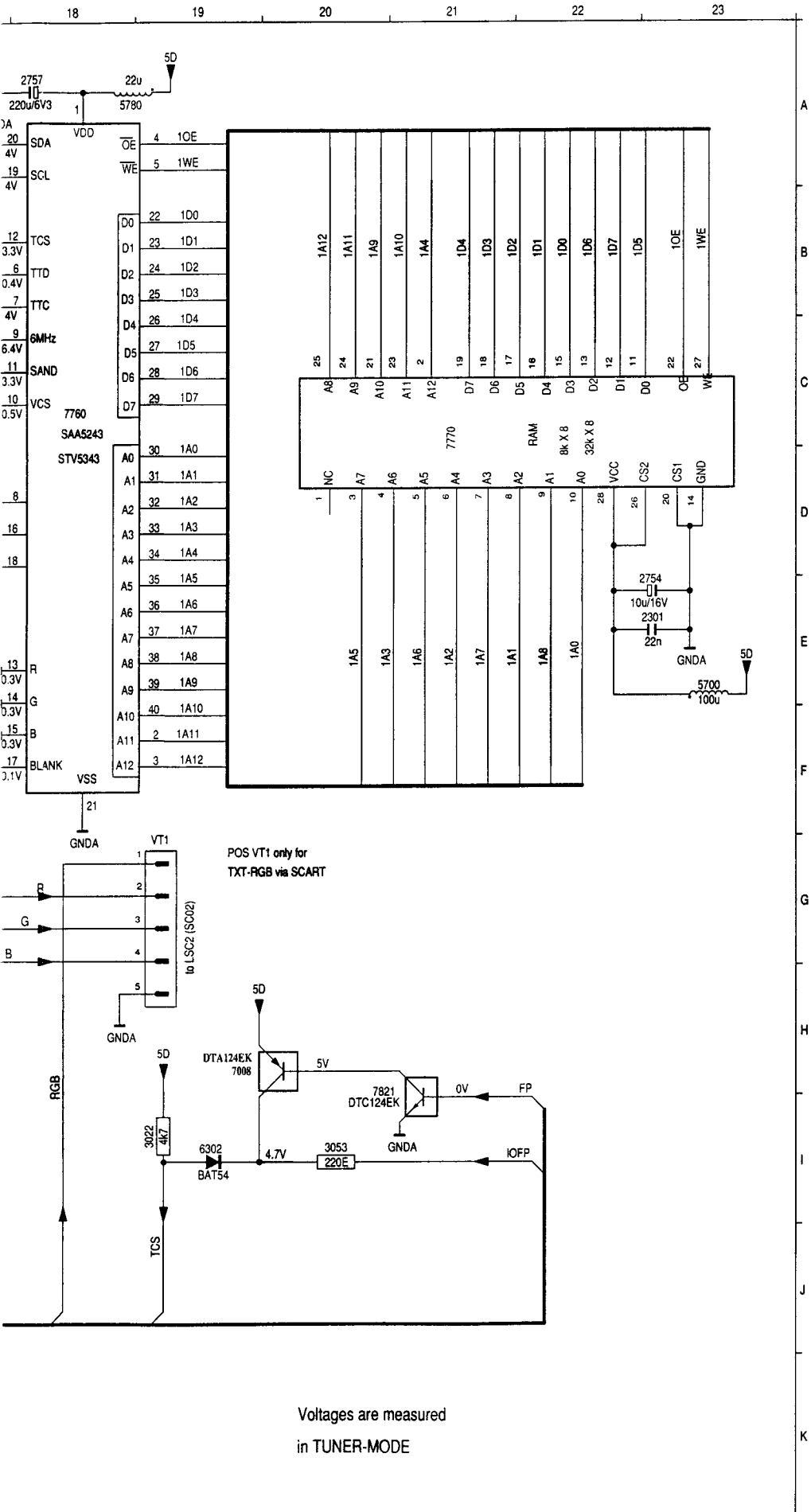
1401 I 4
1600 H17
1752 G11
1989 H 6
1990 H 5
2401 I 5
2402 J 5
2404 J11
2405 B 9
2406 B 8
2408 I 7
2601 D21
2602 F21
2603 F19
2604 E18
2605 F18
2606 G18
2607 H16
2608 H17
2609 E15
2610 D15
2611 H19
2612 C17
2613 C16
2617 D15
2618 I17
2751 B13
2752 H11
2753 H12
2755 B14
3303 J 9
3304 J 9
3307 I 8
3311 J 2
3312 J 2
3313 H11
3314 D13
3430 J 7
3431 J 6
3432 I 6
3433 I 3
3434 J 3
3435 J 3
3436 H 7
3604 B21
3605 E21
3606 E19
3607 E20
3608 F19
3609 G20
3610 G20
3611 G19
3612 I19
3613 D18
3614 I19
3615 C21
3618 J20
3619 E14
3620 C19
3621 E19
3622 E18
3630 F15
3632 F15
3633 F14
3641 G20
3642 H21
3643 H20
3764 C13
3765 C14
3999 H15
5601 I19
5602 E15
5603 C17
5750 G 4
6301 H 7
6603 J19
6612 F20
7201 J 6
7303 J 8
7410 J 6
7453 I 4
7600 D21
7601 I13
7603 E19
7604 D19
7605 I20
7606 G20
7607 J21
7650 E17
7750 D11
7751 C 9
7752 C 7
7753 H 9
CO1 G 1
CO3 D 1
OS3 C23
OS4 F23

TELETEXT PART OF CONTROL BOARD LCOVPT




7814
BC848B
GNDA
12A
IEPOS
IOFP
VMUTE
TCS
0.3V
7504
4.7V
3514
10k
PMBT2369
7780
SAA5231
VCC
VCR
CLKFI
PTR
GND
HFFI
THF
STAMP
STZL
DT
STPH
BL
VIDIN
TCS
TTD
TTC
6MHz
SAND
VCS
OSCOUT
OSCIN
SYNCOUT
FI1
FI2
PTC
CRY
3800
56k
5800
15u
2802
27p
2803
100n
2759
10n
3771
1k
0.5V
5571
2771
560p
7011
DTC124EK
2847
10u/16V
2853
100n
69
TDK-SDL-0011
1900
3854
1k
YIN
LUMOUT
TU
8V2
COMVOUT
OSCI
CHRO
CHR
GND
MC137
7790
66
5S
2789
4u7/25V
3834
470E
7816
BC848B
2.6V
2V
3869
1k
3812
220E
2890
15p
2891
15p
3835
470E
7795
BA7607
Vdd
Vss
2873
47n
71
BL
3858
10k
2871
47n
7202
BC848B
3606
47k
5601
22u
2604
68p
3510
220E
3605
1k
SECAM-OPTION
3508
560E
3509
560E
3788
68E
2870
47n
2872
47n
2.1V
1.5V
7801
BC858B
3402
2k2
1.6V
7401
BC858B
1V
7785
AN3916
CLAMP
AMP
2417
10u
4u7/25V
3405
10k
3406
22k
3404
10k
AGC-LEVEL
ADJUST
FP/PAL
VIDOUT
VIDIN
FPOS
TXPBV
VBS
2760
15p
2763
1n
2764
470p
2765
22n
2766
270p
2767
100p
2799
68n
3804
4k7
3780
68E
2780
47u/6V3
2781
47n
2792
47n
3773
820E
2773
47u/6V3
2768
220p
2800
15p
1800
13.875MHz
3853
1k
2403
120p
5600
10u
2857
1n
3856
56k
2858
100n
2852
10n
2860
10n
3857
680E
2861
1n
3864
1k
2859
120p
5801
10u
2862
10n
70


MC1377
7790
SAA5243
STV5343
7760
7770
TDK-SDL-0011
1900
7504
PMBT2369
7011
DTC124EK
7401
BC858B
7821
DTC124EK
DTA124EK
7008
BAT54
VT1
5571
1800
3.875MHz
TCS
VMUTE
PAL
SCL
SDA
IOFP
GNDA
5D
5S
12A
BL
RGB
FPOS
TXPBV
VBS
TCS
POS VT1 only for
TXT-RGB via SCART
to LSC2 (SC02)
Voltages are measured
in TUNER-MODE

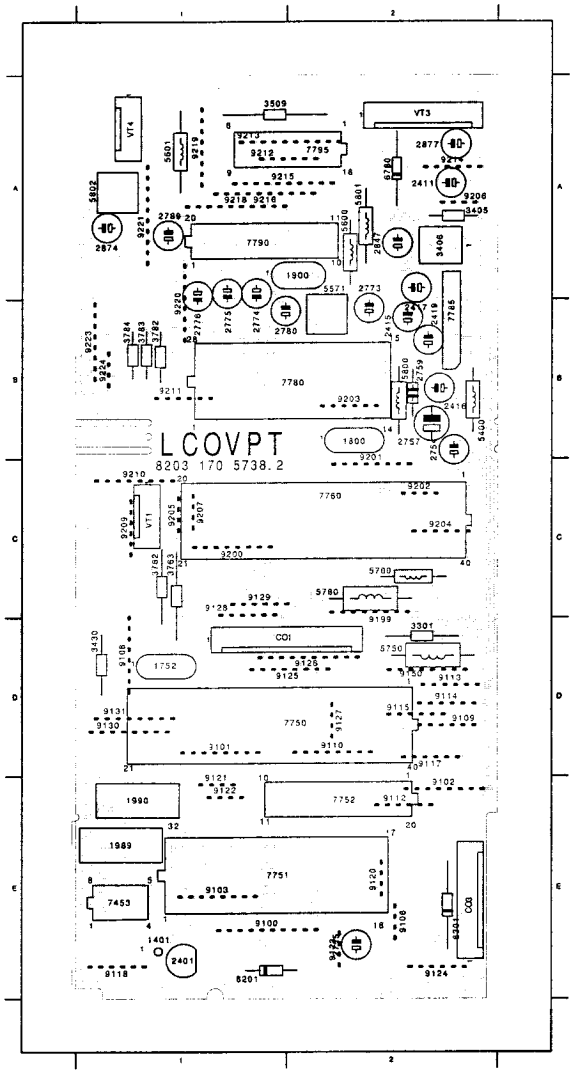


Voltages are measured

in TUNER-MODE

	1800 E12		5700 E23
	1900 E13		5780 A18
	2301 E23		5800 B 9
	2403 E13		5801 F14
	2411 K 3		5802 A 4
	2413 I 4		6302 I19
A	2414 J 4		6780 G 2
	2415 I 5		7008 H19
	2416 K 5		7011 D14
	2417 J 6		7202 I 7
	2418 K 4		7401 J13
	2419 I 4		7504 A12
	2604 I 8		7601 F 4
	2754 E23		7760 C18
	2757 A18		7770 D21
	2759 B11		7780 B10
	2762 C 9		7785 J 6
B	2763 C 9		7790 E15
	2764 D 9		7795 F10
	2765 D 9		7795 I11
	2766 D 9		7795 H 9
	2767 D 9		7801 K 9
	2768 E11		7813 B 4
	2771 D13		7814 A 5
	2773 E12		7815 D 4
	2774 E16		7816 F 7
	2775 D16		7821 I21
C	2776 D16		VT1 G19
	2780 D12		VT3 E 1
	2781 D11		VT4 I 1
	2789 E 8		
	2792 D12		
	2799 E 9		
	2800 E11		
	2802 B 9		
	2803 B 8		
	2847 D15		
D	2852 F14		
	2853 D15		
	2857 E14		
	2858 E14		
	2859 F13		
	2860 F14		
	2861 F14		
	2862 F15		
	2863 F16		
	2864 F16		
E	2865 E16		
	2870 I10		
	2871 H 7		
	2872 J10		
	2873 G 9		
	2874 B 5		
	2875 A 5		
	2876 A 4		
	2877 K 4		
	2890 G 7		
F	2891 G 8		
	3022 I19		
	3053 I20		
	3402 J13		
	3404 K 6		
	3405 K 6		
	3406 K 6		
	3508 I10		
	3509 J10		
	3510 I 9		
G	3511 G16		
	3512 G16		
	3513 G15		
	3514 A12		
	3601 F 4		
	3605 J 7		
	3606 I 8		
	3762 A16		
	3763 A17		
	3771 C13		
H	3773 E11		
	3774 H16		
	3775 H16		
	3776 H17		
	3780 D11		
	3782 E16		
	3783 E16		
	3784 E17		
	3786 J 3		
	3787 J 4		
I	3788 K10		
	3790 D16		
	3791 D16		
	3792 D17		
	3793 E17		
	3794 E17		
	3795 F17		
	3800 B 9		
	3804 D11		
	3812 F 8		
J	3834 E 7		
	3835 G 7		
	3853 E12		
	3854 D14		
	3856 E14		
	3857 F14		
	3858 H15		
	3864 F13		
	3869 F 7		
	3876 C 4		
	3877 B 4		
	3879 A 5		
K	3880 B 3		
	3997 G 4		
	5400 H 4		
	5571 D12		
	5600 E13		
	5601 I 8		

CONTROL BOARD TELETEXT LCOVPT



1401 E 1
1752 D 1
1800 B 2
1900 A 1
1989 E 1
1990 E 1
2401 E 1
2411 A 2
2415 B 2
2416 B 2
2417 A 2
2419 B 2
2754 C 2
2755 E 2
2757 B 2
2758 B 2
2773 B 2
2774 A 1
2775 A 1
2776 B 1
2780 B 1
2789 A 1
2847 A 2
2874 A 1
2877 A 2
3301 D 2
3405 A 2
3406 A 2
3430 D 1
3509 A 1
3762 D 1
3763 D 1
3782 B 1
3783 B 1
3784 B 1
5400 B 2
5571 B 2
5600 A 2
5601 A 1
5700 C 2
5750 D 2
5760 C 2
5800 B 2
5801 A 2
5802 A 1
6201 E 2
6301 E 2
6760 A 2
7453 E 1
7750 D 2
7751 E 1
7752 E 2
7760 C 2
7780 B 1
7785 B 2
7790 A 1
7798 A 2
9100 E 1
9101 D 1
9105 E 2
9106 E 1
9108 E 2
9108 D 1
9109 D 2
9110 D 2
9112 E 2
9113 D 2
9114 D 2
9115 D 2
9117 D 2
9118 E 1
9120 E 2
9121 E 1
9122 E 1
9123 E 2
9124 E 2
9125 D 1
9126 D 1
9127 D 2
9128 C 1
9129 C 1
9130 D 1
9131 D 1
9150 D 2
9199 C 2
9200 C 1
9201 C 2
9203 C 2
9203 B 2
9204 C 2
9205 C 1
9206 A 2
9207 C 1
9209 C 1
9210 C 1
9211 B 1
9212 A 1
9213 A 1
9214 A 2
9215 A 1
9216 A 1
9218 A 1
9219 A 1
9220 B 1
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9223 A 1
9224 B 1
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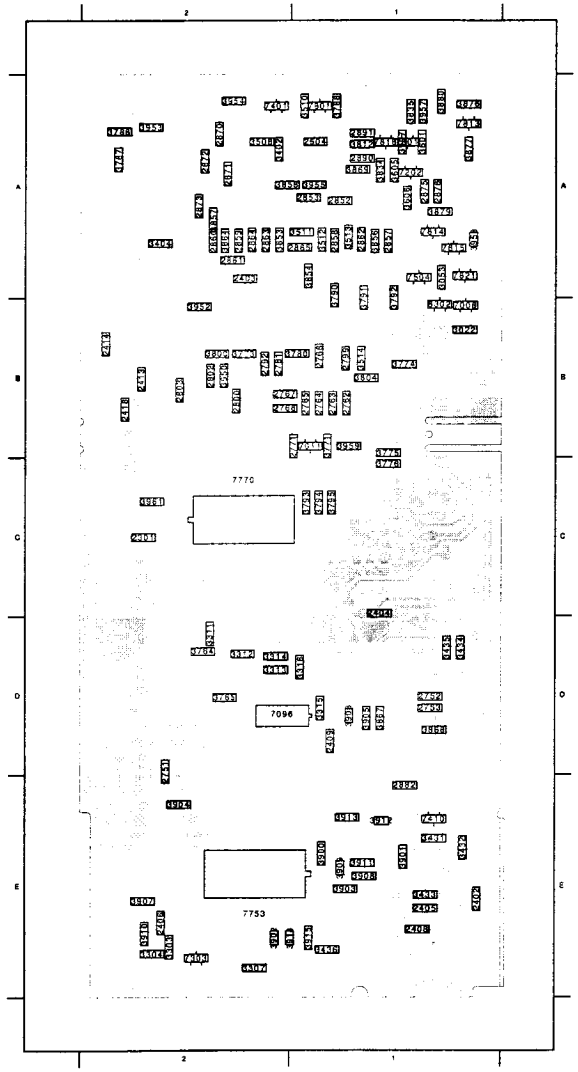
COI E 2
VT1 C 1
VT3 A 2
VT4 A 1



2301 C 2
2402 E 1
2403 A 2
2404 C 1
2405 E 1
2406 E 2
2408 E 1
2409 D 1
2413 B 2
2414 B 2
2418 B 2
2604 A 1
2751 D 2
2752 D 1
2753 D 1
2762 B 1
2763 B 1
2764 B 1
2765 B 1
2766 B 1
2767 B 1
2768 B 1
2771 B 1
2781 B 2
2792 B 2
2799 B 1
2800 B 2
2802 B 2
2803 B 2
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2853 A 1
2857 A 1
2858 A 1
2859 A 2
2860 A 2
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2863 A 2
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2873 A 2
2875 A 1
2876 A 1
2882 E 1
2890 A 1
2891 A 1
3022 B 1
3053 A 1
3303 E 2
3304 E 2
3307 E 2
3311 D 2
3312 D 2
3313 D 2
3314 D 2
3315 D 1
3316 D 1
3402 A 2
3404 A 2
3431 E 1
3432 E 1
3433 E 1
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3435 D 1
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3508 A 2
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3511 A 1
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3513 A 1
3514 B 1
3601 A 1
3605 A 1
3606 A 1
3784 D 2
3785 D 2
3771 B 1
3773 B 2
3774 B 1
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3795 C 1
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3864 A 2
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3868 D 1
3869 A 1
3876 A 1
3877 A 1
3879 A 1
3880 A 1
3900 E 1
3901 E 1
3902 E 2
3903 E 1
3904 E 2
3905 D 1
3906 D 1
3907 E 2
3908 E 1
3909 E 1
3910 E 2
3911 E 1
3912 E 1
3913 E 1
3914 E 1
3915 E 1
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3952 B 2
3953 A 2
3954 A 2
3955 A 1
3957 A 1
3958 A 1
3959 B 1
3961 C 2
3997 A 1
6302 B 1
7008 B 1
7011 B 1
7096 D 1
7202 A 1
7303 E 2
7401 A 2
7410 E 1
7504 A 1
7801 A 1
7753 E 2
7770 C 2
7801 A 1
7813 A 1
7814 A 1
7815 A 1
7816 A 1
7821 A 1

ADJUSTMENTS ON LCOVPT

Setting of the timer clock frequency (2401)
- Connect a frequency counter via a FET probe to pin 2 of IC7453
- Adjust 2401 until the frequency is 32,768 kHz ± 0,12 Hz

Setting of the AGC (3406)
- Tune the set to a signal via the aerial
- Connect an oscilloscope to pin 14 of IC7785
- Adjust the video signal to 2 V_{pp} with 3406

EINSTELLUNG AN LCOVPT

Einstellung der "timer-clock" Frequenz (2401)
- Einen Frequenzmesser mittels FET-Tastkopf an Anschluß 2 von IC7453 schalten
- 2401 so regeln, daß die Frequenz 32,768 kHz ± 0,12 Hz beträgt

Einstellung der AGC (3406)
- Das Gerät auf einen Sender von der Antenne abstimmen
- Ein Oszilloskop an Pin 14 von IC7785 anschließen
- Mit 3406 das Videosignal auf 2 V_{ss} einstellen

RÉGLAGES SUR LCOVPT

Réglage du rythmeur-horloge (2401)
- Brancher un fréquencemètre par une sonde FET sur la broche 2 de l'IC7453
- Ajuster 2401 pour que le fréquence soit de 32,768 kHz ± 0,12 Hz

Réglage de la CAG (3406)
- Ajuster l'appareil à un signal de l'entrée d'antenne
- Brancher un oscilloscope sur la broche 14 de 7785
- Ajuster l'amplitude de la signal vidéo à 2 V_{cc}

INSTELLINGEN OP LCOVPT

Instelling van de klokfrekwentie (2401)
- Sluit een frekwentieteller via een FET probe aan op pin 2 van IC7453
- Regel 2401 af zodat de frekwentie 32,768 kHz ± 0,12 Hz is

Instellingen van de AGC (3406)
- Stem de videorecorder op een zender af via de antenne
- Sluit een oscilloscoop aan op pin 14 van 7785
- Regel de amplitude van het video signaal met 3406 af op 2 V_{tt}

REGOLAZIONE PER LA PARTE LCOVPT

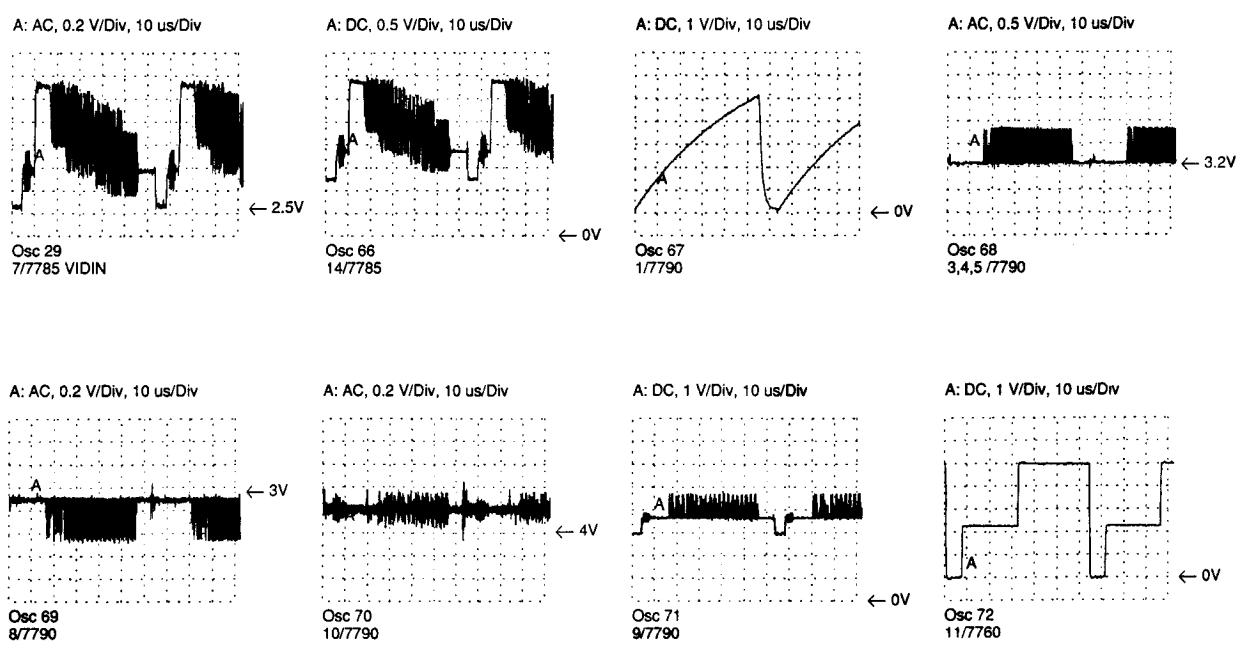
Regolazione della frequenza d'orologio (2401)
- Collegare un frequenzimetro a pin 2 di IC7453 con l'aiuto di un separatore FET
- Regolare 2401 in modo che la frequenza sia 32,768 kHz ± 0.12 Hz

Regolazione dell'AGC (3406)
- Collegare l'apparecchio via antenna ad un segnale
- Collegare un'oscillografo a pin 14 di IC7785
- Regolare il video segnale con 3406 a 2 V_{pp}

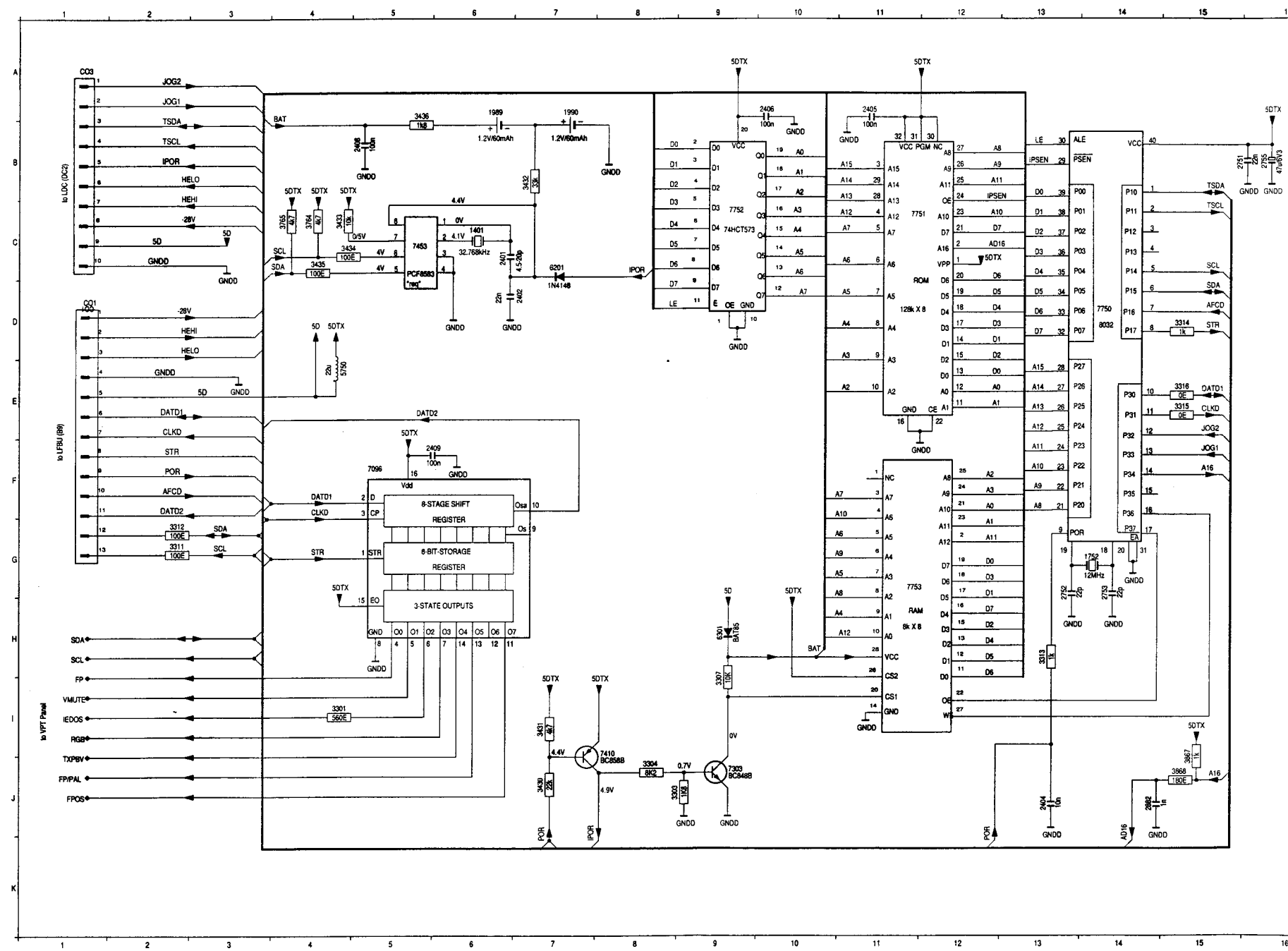
AJUSTES DEL LCOVPT

Ajuste de la frequencia del reloj (2401)
- Conectar un frequencímetro a Pin 2 de IC7453 por medio de una sonda de prueba FET
- Ajustar 2401 de manera que la frequencia sea 32,768 kHz ± 0,12 Hz

Ajuste de AGC (3406)
- Conecte el registrador via antena a una señal
- Conectar un oscillógrafo a pin 14 de IC7785
- Ajustar la señal video a 2 V_{ss} con 3406



CONTROL PANEL TELETEXT LCOVPT



4. DRIVE ASSEMBLY

This tape deck has three motors; one providing precision drive for the scanner unit; the second providing direct drive for the capstan and belt drive for the reel tables; the third motor drives the lift and tape threading/dethreading operations.
By using appropriate scanner units the deck may be used in Mono, HI-FI and S-VHS sets.
Depending on the set requirements a lift for "front loading", "top loading" or "flush loading" can be built-in.
Depending on the set-specification the tape deck is capable of all feature functions i.e. different playback speeds, VISS/VASS/GOTO etc.

Special features are:

Quick start
Short winding time
Automatic cleaning of video heads by cleaning roller

Because of service requirements we have developped a range of service kits which coveres the mechanical heart of our new videorecorders, the "turbo-drive". These kits contain all the related spare parts and repair information you need to ensure a good as new repair.

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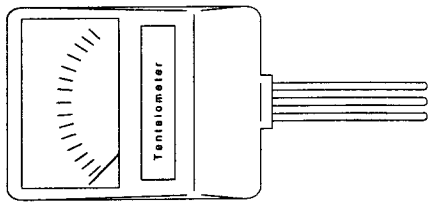
4.2.6	Reverse brake control
4.3	Exploded view Cleaning and lubrication
4.4	Parts list

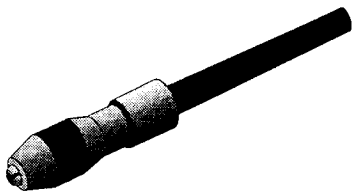
Auxiliary tools for deck adjustment:

Testcassette 4822 397 30103

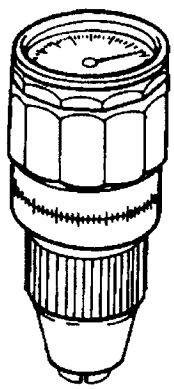


Tentelometer 4822 395 90584

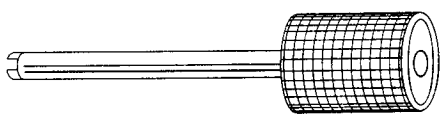
Tool for tapetension adjustment 4822 395 50188



Handle 4822 256 90493



Torquemeter:
600 gf-cm 4822 395 90232
90 gf-cm 4822395 80196



Post adjustment screwdriver 4822 395 50275

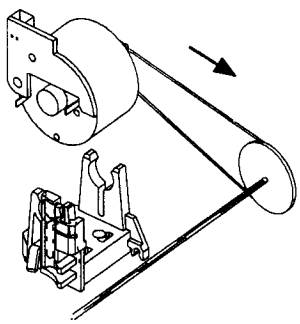
Nylon gloves 5322 395 50275

4.1 Deck parts replacement

Before repairing a deck assembly the top and bottom covers should be removed.
The procedure for the removal and refitting of the following parts is described; only the lift, the scanner, the capstan motor and the A/C head are fixed by screws.
All the other deck assembly parts are held only by snap hooks.

Manual extraction of cassette:
If, after the Eject button has been pressed, the drive does not unthread and eject the cassette, the dethreading/eject operation can also be carried out manually by turning the wheel at the rear of the threading motor.

Fig. 1



To avoid slack tape, alternate this action with the movement of the capstan motor (counter-clockwise), until the tape is completely taken into the cassette.

IMPORTANT:
After each repair has been carried out in the drive assembly, the first operation after repairing must be to bring the cassette compartment into "eject" position by hand.

4.1.2 The Lift

The refitting of the lift has to be done with cassette compartment down and engaged (1st or 2nd catch of gear "A") Loader gear 1 and 2 (pos.103H and 105H) has to be just released by cassette loader trigger (movement of the tape deck without lift from "eject to halfloading"). Cassetteloader gear 1 (pos.103H) may not be twisted after release.

To remove the lift
- Free the holding bracket (Fig. 2) by rotating it up and back from the upper end.
- Remove the left foot of the set.
- Unscrew the 4 screws on the underside of the deck.
- Carefully remove the lift vertically, noting the position of the record protect operating lever.

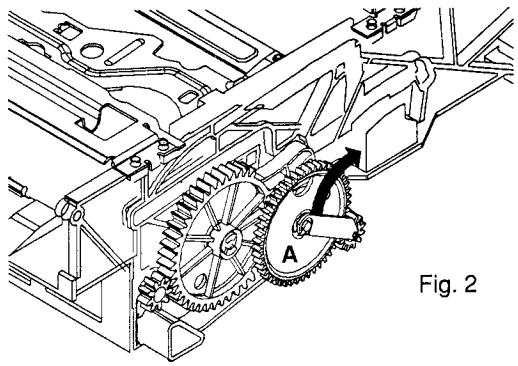


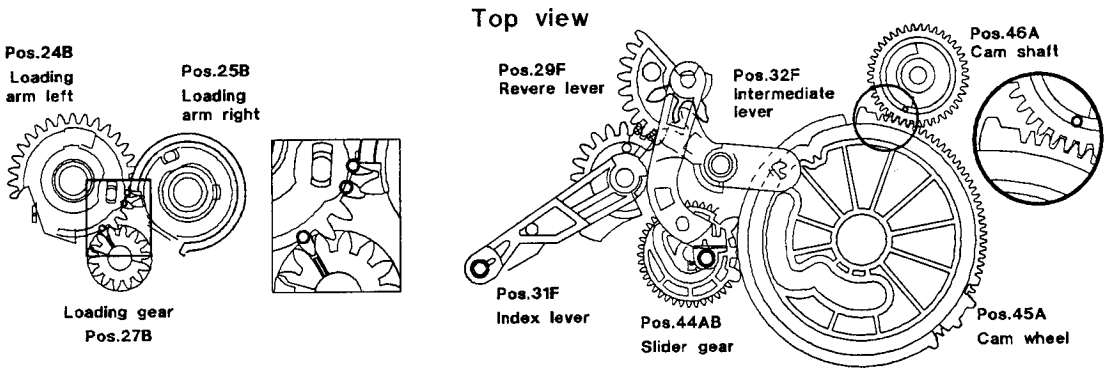
Fig. 2

4.1.1 Deck lay out diagrams

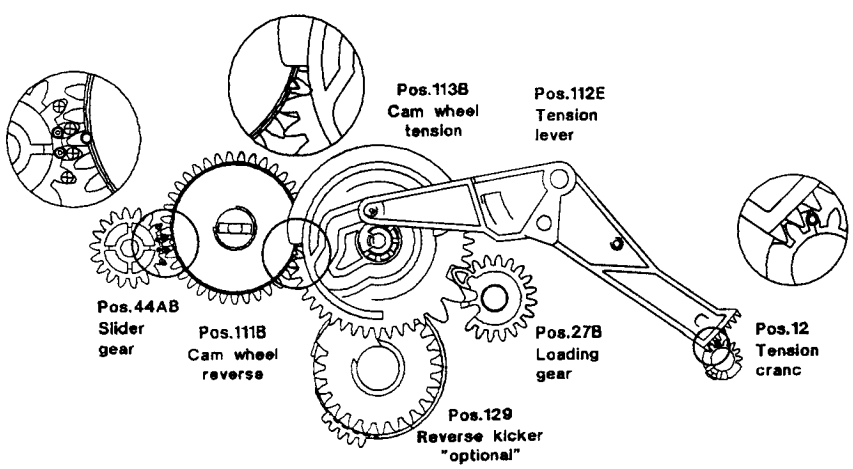
(Deck in position "threaded out")

The following diagrams indicate the relative positions of the gearwheels and levers when the deck is in the threaded out (cassette compartment down) position.

Top view



Underside view



4.1.3 Head disc replacement

- Nylon gloves should be worn when handling the head disc.
- Insert the reference pin C (included with each service head disc) through the hole in bottom of the scanner motor and turn the head disc until the pin snaps in the hole of the rotor (Fig. 3).
- Slacken the fixing screw A of the head disc and pull the head disc from the motor spindle.

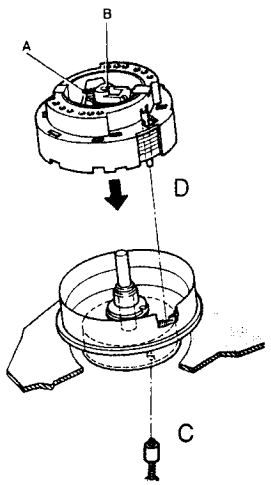


Fig. 3

Installation

- Before carrying out the installation of the the new head disc, make sure that the motor spindle is clean and undamaged (the spindle has to be free of grease and must not be touched with the bare hands).
- Position the head disc on the scanner spindle.

Attention:
The upper protection cover and the 2 Mylar films (0,15 mm thick) remain on the head disc during the fitting process (Fig. 4).

- Press the head disc down at the centre of the protective cover B (Fig. 3) with a force of 1 N.
- Tighten the fixing screw A with a torque of 20 Ncm.
- Remove the protecting cap from the head disc and withdraw the 2 Mylar films laterally from the air gap, and remove the reference pin at the bottom side of the drive assy.

After replacing the head disc, carry out the following adjustments and checks:

- Head switching pulse (gap position, chapter 3)
- Write current adjustments (chapter 3)
- Check tape path alignment (see paragraph 4.2.1)

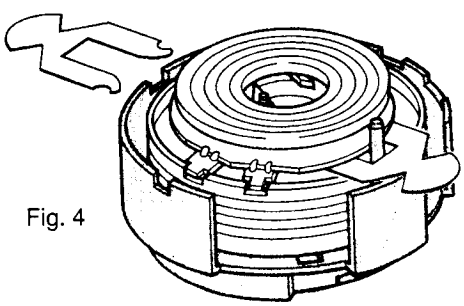


Fig. 4

4.1.4 A/C Head (Combi head) (Pos. 36)

- Remove fixing spring (A) (Fig. 5).
- Remove the fixing screw and replace the A/C head.
- Use a new fixing spring (included with new A/C head) for reassembly.

After the A/C head has been replaced, all adjustments described in paragraph 4.2.1.2 and paragraph 4.2.1.3 have to be carried out.

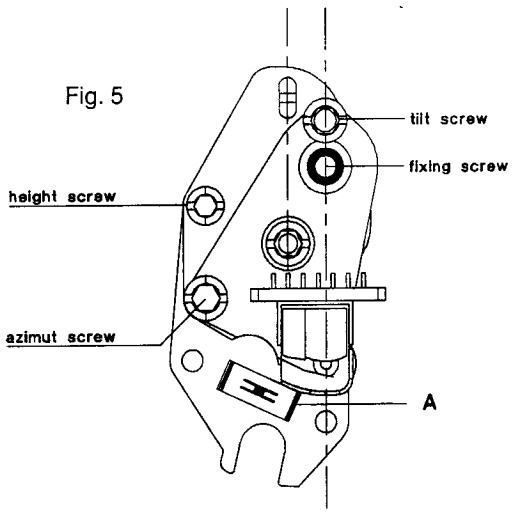


Fig. 5

4.1.5 Threading motor (Pos. 38)

- Remove the belt and disconnect the connector plug.
- Remove the threading motor from the motor supports (Fig. 6).

During reassembly ensure that the threading motor is correctly located in the front and rear supports.

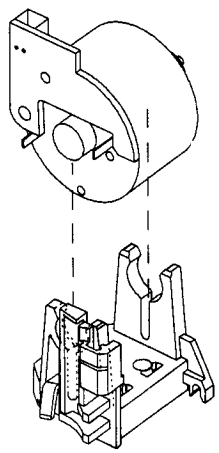


Fig. 6

4.1.6 Capstan motor (Pos. 127)

- Set the drive assy to "Eject" position.
- Remove the belt (pos.126) on the underside; then free the pin from the sensor print (see section 4.1.10). Lift sensor print part vertically (it is plug and socket connected to the capstan motor print). Move both sections of the sensor print clear of the capstan motor.
- Remove the three capstan motor fixing screws (Fig. 7) and withdraw the capstan motor downward from the drive assy.

The reassembly is carried out in reverse order. Make sure that the capstan is free of grease.

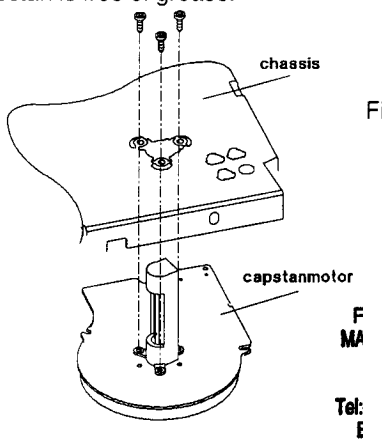


Fig. 7

4.1.7 Pressure roller (Pos. 37)

- Set the drive assy to "Eject" position.
- Unhook and remove the pressure roller tension spring.
- Release the pressure roller guide (pos. 41G) from the guide in the threading motor holder by pressing the top of the motor guide rearwards and rotating the pressure roller guide assembly clockwise by approximately a quarter of a turn.(See Fig. 8) The pressure roller and guide can now be lifted clear.

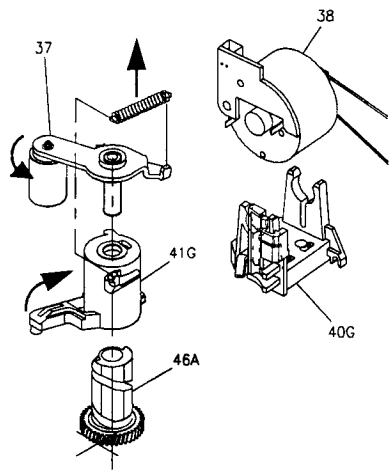
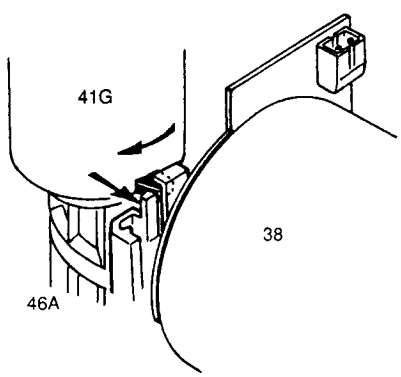


Fig. 8



Ensure that no grease from the pressure roller guide gets to the capstan or pressure roller.
The reassembly is carried out in reverse order.

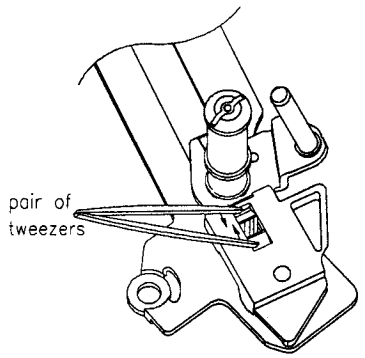
4.1.8 Roller unit right (Pos. 26)

- Set the drive assy to "Eject" position.
- Compress the two snap hooks by means of a pair of tweezers and remove the roller assy from the roller unit right (Fig. 9).
- Unhinge the loading arm right from the holding plate and push the latter towards the front of the deck to remove from the guide (right).

NOTE During reassembly ensure the link from 25B is engaged in the hole of the holder plate 26

After replacing the roller unit (right), the tape path has to be checked, and adjusted if necessary (paragraph 4.2.1).

ig. 9



4.1.9 Roller unit left (Pos.23)

- Set the drive assy to "Eject" position.
- Unhook the tension arm spring (pos. 11), to avoid the tension arm spring being pre-loaded.
- At the bottom side of the drive assy, partially unhinge the sensor mounting print and remove the tension lever (pos.112).
- Compress the two snap hooks by means of a pair of tweezers (Fig. 9)and remove the roller assy (A) from the plate (B).
- Unhinge the loading arm (left) from the holding plate and remove the latter downward from the drive assy through the recess in the chassis (Fig. 10).

The reassembly is carried out in reverse order.

NOTE: During reassembly
1. Place the carriage holding plate in the assembly with the half-round cutout nearest the rear of the deck.
2. When the loading arm is refitted ensure the pin on the underside of 23 is through the link of 24B.

After replacing the roller unit (Left) the tape path has to be checked (paragraph 4.2.1.), and adjusted if necessary.

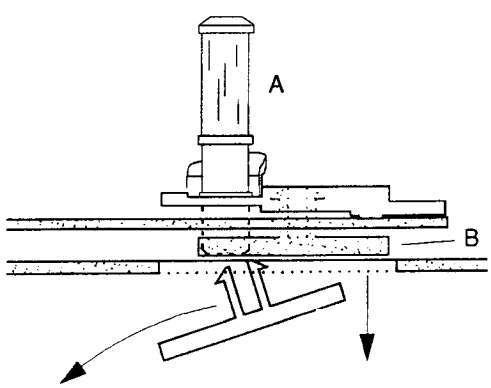


Fig. 10

4.1.10 Sensor print assy (Pos. 118)

For circuit diagram and electrical data see deck electronics (chapter 3).
If a part of the sensor print is defective the whole sensorprint has to be replaced.
Proceed as follows:
- Remove the deck assembly from the set.
- Press the stud A of rivet B right through rivet B. (It can be recovered from the lower support after the board is lifted.) (Fig. 11).
- Lift the sensor print vertically, it is plug and socket connected to the capstan motor print.
- All other parts are attached by means of snap hooks and are easily freed.

Reassembly is carried out by snapping the snap hooks into place, and inserting the rivet B followed by stud A.

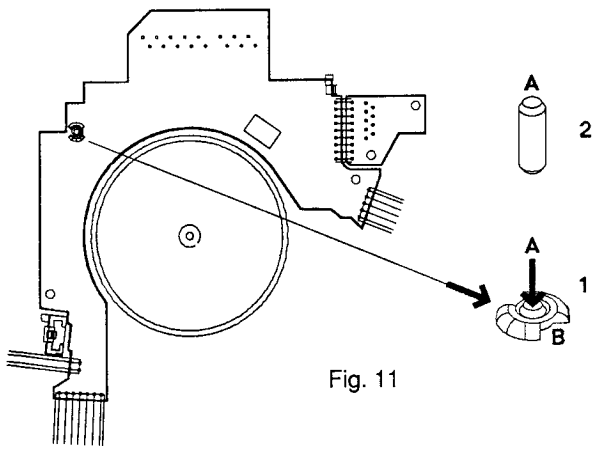
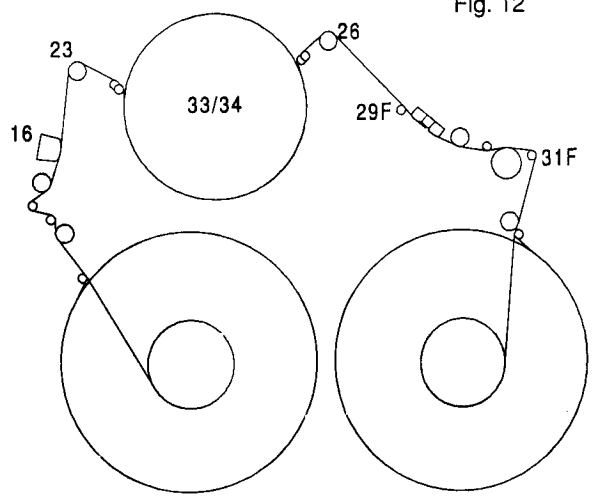


Fig. 11

4.2 Adjustments

4.2.1 Tape path

Fig. 12



4.2.1.1 Roller left unit/roller unit right

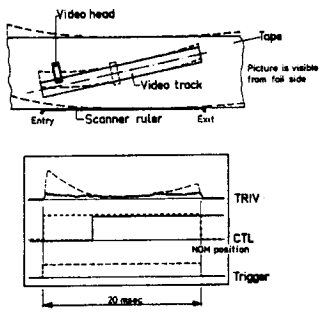
Preparation:
- Connect one input of a dual trace oscilloscope to observe the tape sync pulse CTL.The other input (DC coupled) to observe the tracking information TRIV.
- Trigger the oscilloscope externally on the head pulse HP1.
- Playback the black and white section of the alignment test tape.
- Set the deck in the condition where the video heads are running along the upper edge of the tracks only by:

1. Pressing the auto tracking button and watch the tape sync pulse move to the left in relation to the TRIV signal.
2. Note the extreme left hand position reached by the sync pulse, repeat as necessary.
3. Stop the movement of the pulse when the TRIV signal reduces to 1/2 to 2/3 maximum amplitude by pressing the normal play button. A noisy picture (disturbances) is visible on the TV set and the CTL pulse should be to the left of the display.

The machine will retain this position in memory until an eject is carried out. This condition works only if X-distance is adjusted.

Adjustment:
Adjust the left and right roller units to make the tracking signal TRIV straight and flat as possible (Fig. 13).

Fig. 13



4.2.1.2 A/C Combi head

Tilt angle adjustment

- Set the drive to feature mode (e.g. +7)
- By means of the tilt angle adjusting screw move the tape until the lower edge just touches the tape guide A1 (see Fig. 14) the tape must not be distorted at the lower edge (by pressing onto guide).

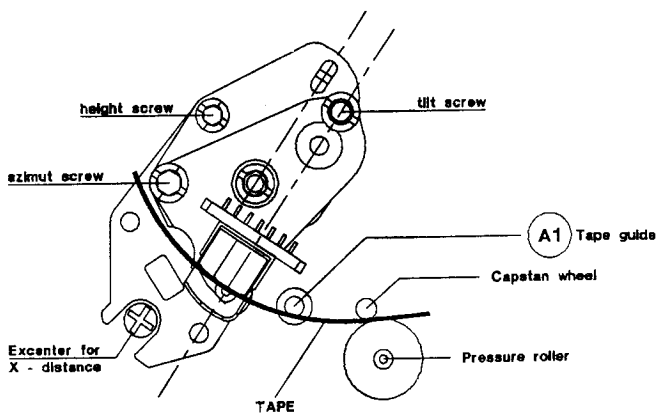


Fig. 14

Adjustment of the azimuth angle and the head height

- Connect an oscilloscope to the linear Audio output.
- Play the section of the test cassette with the audio signal 400 Hz.
- Adjust for maximum output voltage by means of the height adjustment screw
- Play the section of the test cassette with the audio signal 8 kHz.
- Adjust to maximum output voltage by means of the azimuth adjustment screw (Fig. 14).
- If necessary, repeat this procedure
- Check the tilt angle adjustment

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, it is possible, that the adjustments described in paragraph 4.2.1.1 and paragraph 4.2.1.2 have to be repeated several times.

4.2.2 Adjustment of the horizontal distance (x distance)

- Before this adjustment is carried out, insert the test cassette (start from Eject position). Call the service test program (tracking value will take up its nominal position) and press the "play" button.
- Playback the black/white part of the test cassette.)
- Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the eccentric screw (Fig. 14)

4.2.3 Brake band adjustment

- Set the drive to "Play"
- Adjust the brake band by means of adjusting tool (from the underside of the drive), until the edge of the elbow of the tape tension arm overlaps with the left inner edge of the left guide by 0.5mm (see Fig. 15)

4.2.4 Tape tension adjustment

- Play a VCR cassette (E 180) starting from the beginning of the tape.
- Measure the tape tension before the roller unit left by means of a tentelometer.
- Adjust the tension arm spring (pos.11) to a tape tension of 0,24 N ± 0,02 N (24 g 2 g) by means of the adjustment tool (from the underside of the drive, Fig. 15).

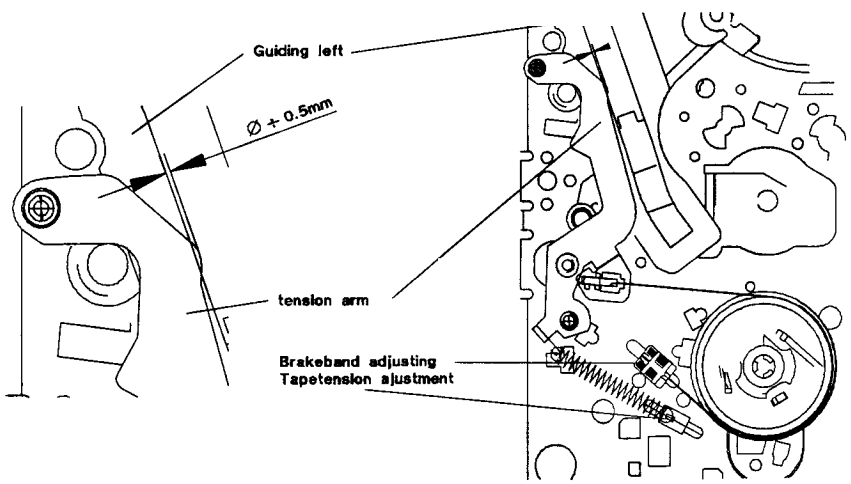
4.2.5 Friction clutch control check

- Set the drive to "Play" position.
- Place the torquemeter on the right reel.
- Turn the capstan motor to move the right reel clockwise.
- Keep turning, until the indication at the torquemeter no longer changes (Fig. 16)
- The torque has to be 10,5 mNm ± 25% (105 gFcm 25%)

4.2.6 Reverse brake control

- Set the drive to "Reverse" position.
- Place a torquemeter on the right reel and turn the latter counterclockwise, until the reel just starts to flip.
- The value indicated at the torquemeter has to be 15mNm ± 25% (150 gFcm 25%) (Fig. 16).

Fig



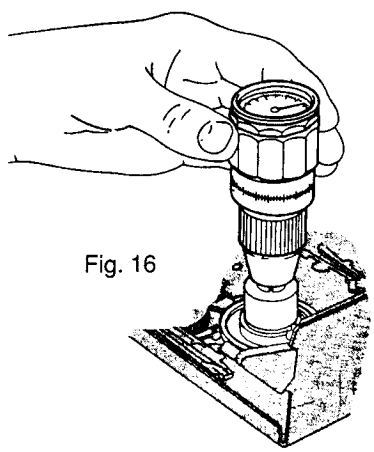
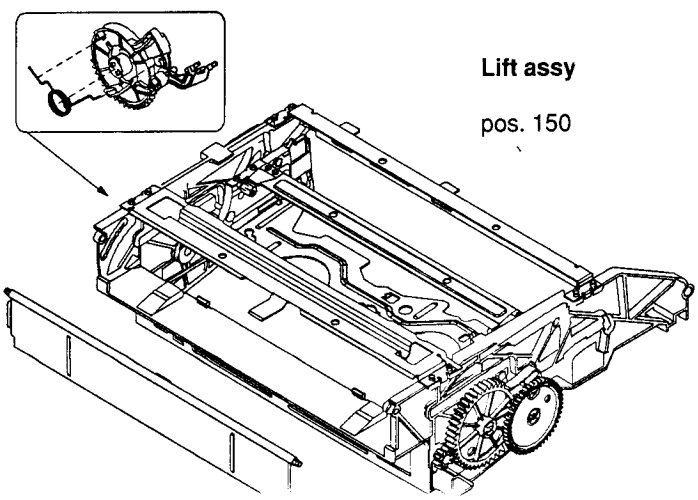


Fig. 16

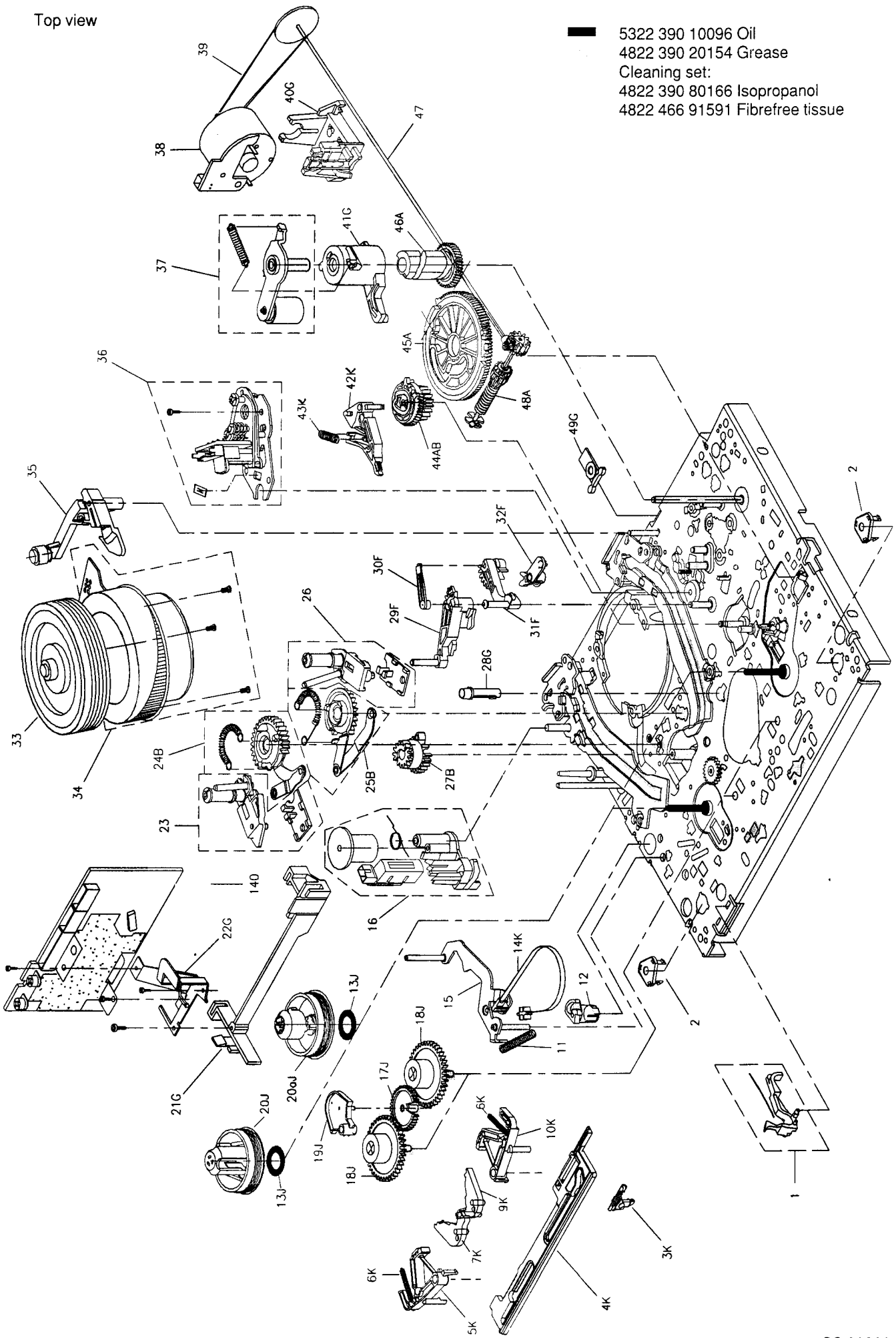


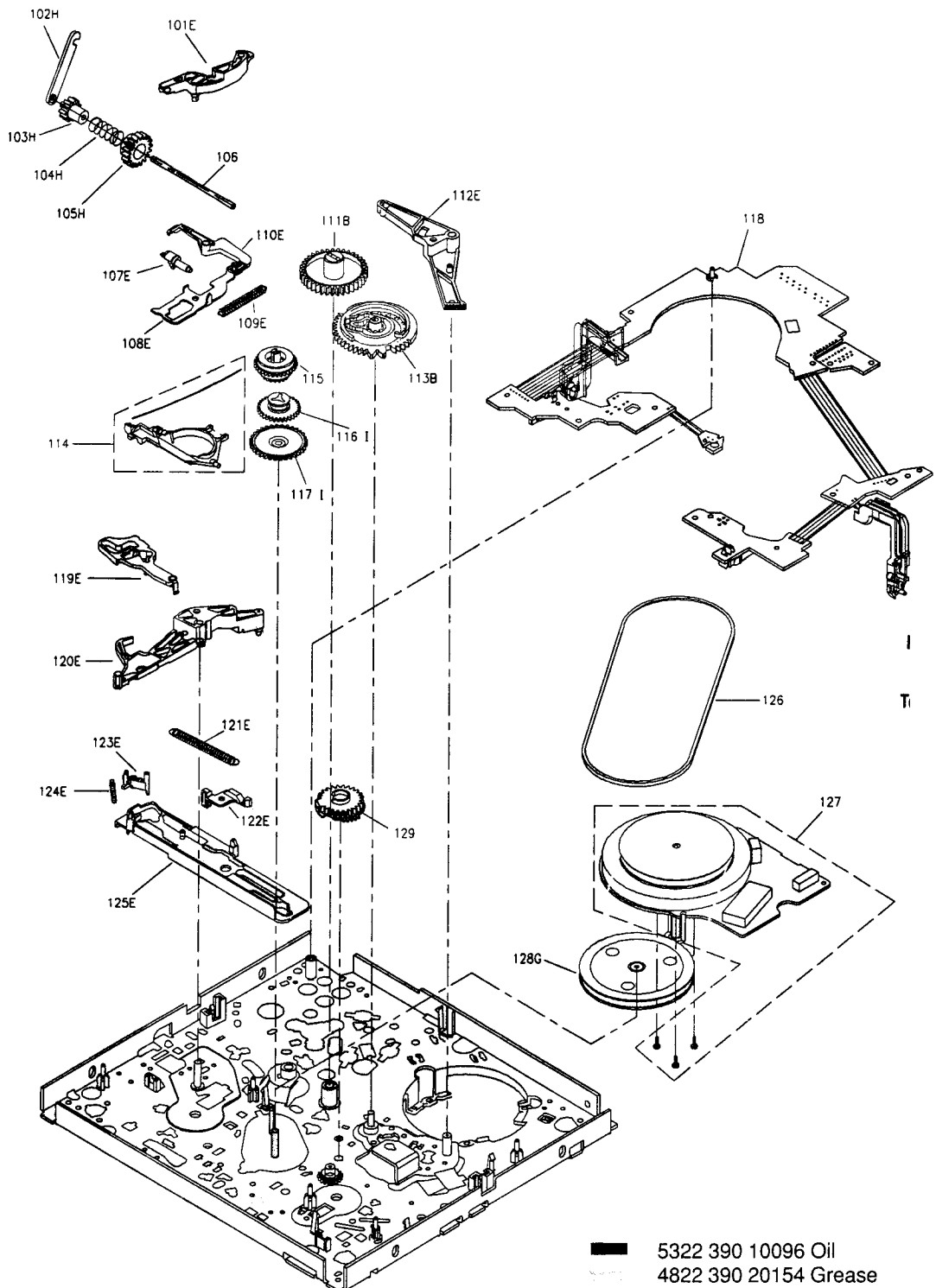
Lift assy

pos. 150

4.3 Exploded view

Top view





5322 390 10096 Oil
4822 390 20154 Grease
Cleaning set:
4822 390 80166 Isopropanol
4822 466 91591 Fibrefree tissue

4.4 Partslist

Pos.	Description	KIT's									Code number 4822
		A	B	E	F	G	H	I	J	K	
1	Rec.protection lever (with spring)										403 70546
2	Chassis mounting spring (2x)										492 71022
3	Trigger lever									K	
4	Trigger slider									K	
5	Main brake left									K	
6	Main brake spring (2x)									K	
10	Main brake right									K	
11	Tension arm spring										492 33317
12	Tension crank										403 70551
13	Slip ring								J		
14	Tension band									K	
15	Tension arm										403 70547
16	Erase head										249 40293
17	Swivelling gear								J		
18	Brake gear (2x)								J		
19	Swivelling plate								J		
20	Reel table (S)								J		
20a	Reel table (T)								J		
21	Headamplifier holder					G					
22	Bracket					G					
23	Roller unit left										528 70771
24	Loading arm left		B								
25	Loading arm right		B								
26	Roller unit right										528 70772
27	Loading gear		B								
28	Light prism					G					
29	Index lever				F						
30	Reverse clip				F						
31	Reverse lever				F						
32	Intermediate lever				F						
33	Head disc 4/2										691 20528
34	Scanner motor 4/2 (with screws)										361 21547
35	Cleaning roller										528 70773
36	A/C Head (with clip and screws)										249 10468
37	Pressure roller (with spring)										528 70774
38	Threading motor										361 21486
39	Threading belt										358 20421
40	Motor holder					G					
41	Pressure roller guide					G					
42	Reverse brake									K	
43	Reverse brake spring									K	
44	Slider gear	A	B								
45	Cam wheel	A									
46	Cam shaft	A									
47	Pulley shaft										528 81462

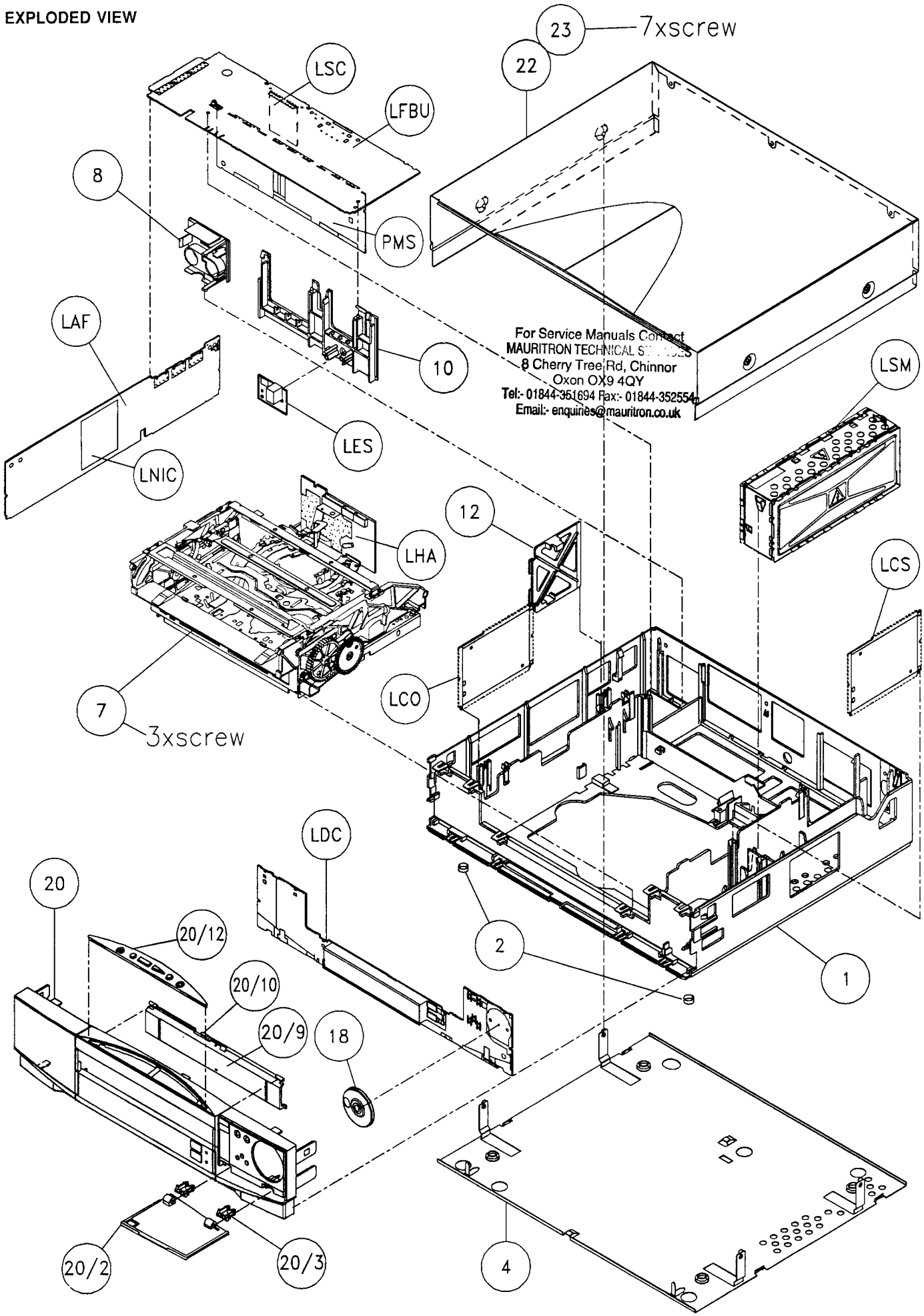
Pos.	Description	KIT's									Code number 4822
		A	B	E	F	G	H	I	J	K	
48	Worm shaft	A									
49	Chassis mounting clip					G					
101	Casette loader trigger			E							
102	Clip						H				
103	Casette loader gear 1						H				
104	Casette loader spring						H				
105	Casette loader gear 2						H				
106	Spindle										535 93277
107	Pulse roller			E							
108	Pulse slider			E							
109	Pulse slider spring			E							
110	Pulse lever			E							
111	Cam wheel reverse		B								
112	Tension lever			E							
113	Cam wheel tension		B								
114	Clutch lever (with spring)										403 70549
115	Clutch										528 20736
116	Changing gear							I			
117	Double gear							I			
118	Sensor print (with stud and rivet)										214 33758
119	Main slider lever			E							
120	Cam wheel lever			E							
121	Slider spring			E							
122	Clutch slider			E							
123	Slider lever trigger			E							
124	Slider lever spring			E							
125	Main slider			E							
126	Driving belt										358 31166
127	Capstan motor (with screws)										361 21484
128	Gear pulley					G					
129	Reverse kicker (with transmission gears) *)										522 20451
140	Flex cable										320 40287
150	Lift										443 63702
KIT	A (SBC 7010)										310 31954
KIT	B (SBC 7111)										310 31955
KIT	E (SBC 7114)										310 31958
KIT	F (SBC 7115)										310 31959
KIT	G (SBC 7116)										310 31961
KIT	H (SBC 7117)										310 31962
KIT	I (SBC 7118)										310 31963
KIT	J (SBC 7119)										310 31996
KIT	K (SBC 7120)										310 31997

*) optional

For getting a high repair standard all spare parts included in a kit have to be replaced with the exception of kit E and kit G.

What are the benefits of service kits:
A better quality of repair (not only the defect part is replaced but also the related affected parts).
A faster repair (all the parts are already collected and are focussed on the problem).
A cheaper repair (parts are manufactured with the same parrts used for production, giving a high quality for lowest price).

EXPLODED VIEW



For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

		CABINET PARTS	GEHÄUSETEILE	PIECES DE PRESENTATION
1	4822 464 50907	Frame	Rahmen	Boîtier
2	4822 462 41806	Foot	Fuss	Pied
4	4822 443 51235	Bottom	Boden	Fond
7	4822 502 13884	Screw	Schraube	Vis
8	4822 444 60842	Cover	Abdeckung	Couvercle
	4822 462 71876	Cover only for SECAM	Abdeckung nur für SECAM	Couvercle seul pour SECAM
10	4822 466 93136	I/O Block	I/O Block	I/O bloc
12	4822 256 91917	Support	Halterung	Support
18	4822 413 41721	Rotary knob	Drehknopf	Tourbouton
20	4822 443 41186	Control panel (VR722/02/08)	Bedienpaneel (VR722/02/08)	Panneau de commande (VR722/02/08)
	4822 444 30445	Control panel (VR722/05/13)	Bedienpaneel (VR722/05/13)	Panneau de commande (VR722/05/13)
	4822 443 41188	Control panel (VR723/02)	Bedienpaneel (VR723/02)	Panneau de commandeVR723/02
	4822 443 41187	Control panel (VR723/05)	Bedienpaneel (VR723/05)	Panneau de commandeVR723/05
	4822 443 41186	Control panel (VR7229)	Bedienpaneel (VR7229)	Panneau de commandeVR7229
20/2	4822 443 63746	Key flap (VR722)	Tastenklappe (VR722)	Touche clapet (VR722)
	4822 443 63756	Key flap (VR723)	Tastenklappe (VR723)	Touche clapet (VR723)
	4822 443 63755	Key flap (VR7229)	Tastenklappe (VR7229)	Touche clapet (VR7229)
20/3	4822 417 11171	Hinge	Scharnier	Charnière
20/9	4822 443 63747	Lift flap	Liftklappe	Clapet (VR422,VR522)
20/10	4822 492 70896	Spring	Feder	Ressort
20/12	4822 466 93188	Switchplate	Tastenblock	Clavier
	4822 466 82927	Switchplate (only for VR7229)	Tastenblock (nur für VR7229)	Clavier (seul pour VR7229)
22	4822 443 63745	Cover	Deckel	Couvercle
23	4822 502 13173	Screw c-torx M3x6	Schraube c-torx M3x6	Vis c-torx M3x6
150/1	$ 4822 321 10249	Mains cord	Netzkabel	Cordon secteur
	$ 4822 321 10886	Mains cord (only for /05)	Netzkabel (nur für /05)	Cordon secteur (seul pour /05)
150/2	4822 321 23415	Antenna cable (PAL)	Antennenkabel (PAL)	Cable d'antenne (PAL)
	4822 321 23516	Antenna cable (SECAM L)	Antennenkabel (SECAM L)	Cable d'antenne (SECAM L)
150/14	4822 321 61282	Scart cable	Scart Kabel	Cable scart

		ONDERDELEN APPARAAT	COMPONENTES MUEBLA	PARTI DEL MOBILE
1	4822 464 50907	Frame	Bastidor	Carcassa
2	4822 462 41806	Voet	Pie	Piede
4	4822 443 51235	Bodem	Fondo	Fondo
7	4822 502 13884	Schroef	Tornillo	Vite
8	4822 444 60842	Deksel	Tapa	Coperchio
	4822 462 71876	Deksel aleen voor SECAM	Tapa sólo para SECAM	Coperchio solo per SECAM
10	4822 466 93136	I/O blok	Bloque I/O	Blocco I/O
12	4822 256 91917	Steun	Perno	Perno
18	4822 413 41721	Draaiknop	Botón giratorio	Bottone girare
20	4822 443 41186	Bedienpaneel (VR722/02/08)	Panel de mandos (VR722/02/08)	Pannello di comandi (VR722/02/08)
	4822 444 30445	Bedienpaneel (VR722/05/13)	Panel de mandos (VR722/05/13)	Pannello di comandi (VR722/05/13)
	4822 443 41188	Bedienpaneel (VR723/02)	Panel de mandos (VR723/02)	Pannello di comandi (VR723/02)
	4822 443 41187	Bedienpaneel (VR723/05)	Panel de mandos (VR723/05)	Pannello di comandi (VR723/05)
	4822 443 41186	Bedienpaneel (VR7229)	Panel de mandos (VR7229)	Pannello di comandi (VR7229)
20/2	4822 443 63746	Toetsklep (VR722)	Teclado ventana(VR722)	Tastiera sportello (VR722)
	4822 443 63756	Toetsklep (VR723)	Teclado ventana(VR723)	Tastiera sportello (VR723)
	4822 443 63755	Toetsklep (VR7229)	Teclado ventana (VR7229)	Tastiera sportello (VR7229)
20/3	4822 417 11171	Scharnier	Bisagra	Cerniera
20/9	4822 443 63747	Liftklep	Ventana	Valvola
20/10	4822 492 70896	Veer	Muelle	Molla
20/12	4822 466 93188	Toetsenpaneel	Teclado de mandos	Tastiera di comandi
	4822 466 82927	Toetsenpaneel (VR7229)	Teclado de mandos (VR7229)	Tastiera di comandi (VR7229)
22	4822 443 63745	Deksel	Tapa	Coperchio
23	4822 502 13173	Schroef c-torx M3x6	Tornillo c-torx M3x6	Vite c-torx M3x6
150/1	$ 4822 321 10249	Netkabel	Cable de red	Cavo di rete
	$ 4822 321 10886	Netkabel (alleen voor /05)	Cable de red (sólo para /05)	Cavo di rete (solo per /05)
150/2	4822 321 23415	Antennekabel (PAL)	Cable de antena (PAL)	Cavo d'antenna (PAL)
	4822 321 23516	Antennekabel (SECAM L)	Cable de antena (SECAM L)	Cavo d'antenna (SECAM L)
150/14	4822 321 61282	Scartkabel	Cable de scart	Cavo di scart

$ ... Safety component, use only this type

Power supply LSM45

CONNECTORS

$	4822 256 30274	Fuse holder
	4822 267 50811	11 pin
	4822 265 41063	9 pin
$	4822 492 63997	Spring
$	4822 267 31064	MAINSCONNECTOR
$	4822 462 71854	Insulation wall
$	4822 255 41265	Cooling block
	4822 466 82659	Cooling plate
	4822 255 40181	Insulator

MISCELLANEOUS

1101	$	4822 070 32002	Fuse 2A/250V
1202	$	4822 071 58009	Fuse 80mA

CAPACITORS

2101	$	4822 121 70164	220 nF 250V
2103	$	4822 122 33441	1 µF 400V
2105	$	4822 122 33076	470 pF 400V
2107	$	4822 122 33076	470 pF 400V
2108	$	4822 121 70163	100 nF 250V
2112		4822 124 41556	100 µF 385V
2113	$	4822 122 33441	1 µF 400V
2114		4822 124 41506	47 µF 16V
2115		4822 121 42408	220 nF 63V
2116		4822 121 70162	10 nF 400V
2117		5322 121 42386	100 nF 63V
2118		4822 121 43939	3,9 nF 63V
2119		4822 121 51442	2,2 nF 50V
2120	$	4822 122 33442	330 pF
2121		5322 121 42386	100 nF 63V
2201		4822 124 41069	47 µF 63V
2204		4822 124 40739	680 µF 25V
2205		4822 124 40739	680 µF 25V
2206		4822 124 40739	680 µF 25V
2207		4822 124 40739	680 µF 25V
2209		4822 124 41069	47 µF 63V
2210		4822 121 41856	22 nF 250V
2211		4822 121 41856	22 nF 250V
2214		4822 124 40199	680 µF 16V
2215		4822 124 40199	680 µF 16V
2217		5322 121 42386	100 nF 63V

RESISTORS

3102	$	4822 053 21395	3,9 MΩ 0,5W
3103	$	4822 053 21395	3,9 MΩ 0,5W
3104		4822 116 52224	470 Ω 0,5W
3106	$	4822 053 21225	2,2 MΩ 0,5W
3109		4822 053 30338	3,3 Ω 2,5W
3112		4822 116 52271	33 kΩ 0,5W
3119		4822 116 52271	33 kΩ 0,5W
3120		4822 116 52215	220 Ω 0,5W
3121		4822 050 13302	3,3 kΩ 0,4W
3122		4822 116 83071	270 kΩ 0,25W
3123		4822 053 20564	560 kΩ 0,25W
3125		4822 116 52224	470 Ω 0,5W
3126		4822 116 52233	10 kΩ 0,5W
3127		4822 116 52191	33 Ω 0,5W
3128		4822 116 52283	4,7 kΩ 0,5W
3129		4822 116 52284	47 kΩ 0,5W
3130		4822 116 52284	47 kΩ 0,5W
3131		4822 050 24708	4,7 Ω 0,6W
3132		4822 116 52175	100 Ω 0,5W
3201		4822 116 52289	5,6 kΩ 0,5W
3202		4822 116 80175	4,7 kΩ 0,5W
3203		4822 116 52224	470 Ω 0,5W
3204		4822 100 11205	Trimmer
3205		4822 116 52228	680 Ω
3206		4822 050 11002	1 kΩ 0,4W
3207		4822 116 52222	390 Ω 0,5W
3208		4822 116 52215	220 Ω 0,5W
3209		4822 116 52176	10 Ω 0,5W
3210		4822 116 52238	12 kΩ 0,5W

COILS

5103	$	4822 218 21101
5114	$	4822 146 31131
5203		4822 157 53006
5204		4822 157 53006
5207		4822 157 53528
5209		4822 157 53528
5210		4822 157 53528

DIODES

6110	4822 130 80858	1N5062
6111	4822 130 80858	1N5062
6112	4822 130 80858	1N5062
6113	4822 130 80858	1N5062
6114	4822 130 80858	1N5062
6115	4822 130 30621	1N4148
6116	4822 130 30621	1N4148
6201	4822 130 81272	MUR115
6203	4822 130 81516	MUR410
6204	4822 130 81516	MUR410
6206	4822 130 81272	MUR115
6209	4822 130 82627	SB540

TRANSISTORS & IC's

7105	4822 209 31528	TDA4605-3
7135	4822 130 62753	IRFBC30
7210 $	4822 209 30107	CNX82A/OF4821
7253	4822 209 81397	TL431CLP

Headamplifier LHA

$ 4822 214 33817 LHA 4/2

Capstan switch LCS

$ 4822 214 33651

$ ... Safety component, use only this type

Family board LFBU

CONNECTORS

	4822 267 31512	2 pin
	4822 267 40696	3 pin
	4822 267 40624	5 pin
	4822 267 41062	6 pin
	4822 265 40908	7 pin
	4822 267 50621	7 pin
	4822 267 50721	9 pin
	4822 267 50722	10 pin
	4822 267 51163	10 pin
	4822 267 50723	13 pin
	4822 267 51164	16 pin
	4822 265 41077	CINCH connector
	4822 267 31513	Scart

MISCELLANEOUS

1101	4822 242 81099	Crystal KD7218FFA
1102 $	4822 071 56301	Fuse 630mA

CAPACITORS

2103	5322 122 32658	22	pF	50V	
2104	5322 122 32658	22	pF	50V	
2105	4822 124 80231	47	µF	16V	
2106	5322 126 10223	4,7	nF	63V	
2107	5322 122 34123	1	nF	50V	
2108	5322 121 42489	33	nF	250V	
2109	4822 122 31947	100	nF	63V	
2110	4822 124 80231	47	µF	16V	
2111	4822 122 33177	10	nF	50V	
2112	4822 122 31947	100	nF	63V	
2113	5322 126 10223	4,7	nF	63V	
2114	4822 124 80231	47	µF	16V	
2116	5322 122 34123	1	nF	50V	
2117	4822 124 80228	4,7	µF	25V	
2119	4822 122 31947	100	nF	63V	
2120	4822 124 80231	47	µF	16V	
2121	4822 122 33177	10	nF	50V	
2122	4822 122 33177	10	nF	50V	
2124	4822 124 80228	4,7	µF	25V	
2125	4822 124 80228	4,7	µF	25V	
2126	4822 124 80231	47	µF	16V	
2127	5322 122 32531	100	pF	50V	
2129	5322 122 34123	1	nF	50V	
2130	4822 122 31947	100	nF	63V	
2131	4822 122 31947	100	nF	63V	
2133	5322 122 32654	22	nF	63V	
2134	5322 121 42386	100	nF	63V	
2135	5322 122 32531	100	pF	50V	
2201	4822 124 80231	47	µF	16V	
2202	4822 124 80228	4,7	µF	25V	
2203	4822 124 80231	47	µF	16V	
2204	4822 122 32646	5,6	nF	50V	
2205	5322 122 32654	22	nF	63V	
2206	4822 124 80228	4,7	µF	25V	
2208	4822 124 80231	47	µF	16V	
2209	4822 124 42213	100	µF	16V	
2210	4822 121 43526	47	nF	100V	
2211	5322 122 34123	1	nF	50V	
2212	4822 124 80231	47	µF	16V	
2213	4822 121 51521	12	nF	50V	
2214	5322 122 31863	330	pF	50V	
2215	5322 122 34123	1	nF	50V	
2216	5322 121 42489	33	nF	250V	
2217	4822 121 43187	27	nF	250V	
2218	4822 121 41857	10	nF	250V	
2219	4822 124 80229	22	µF	16V	
2220	4822 122 33806	820	pF	63V	
2221	4822 122 32575	220	pF	500V	
2222	5322 122 32531	100	pF	50V	
2223	5322 122 32531	100	pF	50V	
2224	4822 121 42408	220	nF	63V	
2225	4822 124 80231	47	µF	16V	
2226	5322 122 32654	22	nF	63V	
2227	4822 122 33175	2,2	nF	50V	
2228	5322 122 34123	1	nF	50V	
2229	4822 124 80228	4,7	µF	25V	
2230	4822 122 33177	10	nF	50V	
2231	4822 124 80231	47	µF	16V	
2232	5322 122 34123	1	nF	50V	
2233	4822 122 33175	2,2	nF	50V	
2234	4822 121 42408	220	nF	63V	
2240	4822 124 80229	22	µF	16V	
2241	4822 122 31947	100	nF	63V	
2501	5322 122 34123	1	nF	50V	
2503	5322 122 32268	470	pF	50V	
2504	4822 122 31644	2,2	nF	63V	
2505	5322 122 32268	470	pF	50V	
2506	4822 122 33175	2,2	nF	50V	
2507	5322 122 32268	470	pF	50V	
2508	5322 122 32268	470	pF	50V	
2509	4822 122 33175	2,2	nF	50V	
2510	4822 122 33175	2,2	nF	50V	
2511	5322 122 32654	22	nF	63V	
2512	5322 122 32654	22	nF	63V	
2513	5322 122 32654	22	nF	63V	
2514	5322 122 32654	22	nF	63V	
2515	4822 124 41999	4,7	µF	25V	
2517	5322 122 32654	22	nF	63V	
2518	4822 124 23053	1	µF	50V	
2519	4822 124 23053	1	µF	50V	
2520	5322 122 32654	22	nF	63V	
2521	4822 124 23053	1	µF	50V	
2522	4822 124 23053	1	µF	50V	
2523	4822 124 23053	1	µF	50V	
2524	4822 122 33177	10	nF	50V	
2525	5322 122 32654	22	nF	63V	
2526	4822 124 42213	100	µF	16V	
2527	4822 124 42213	100	µF	16V	
2529	5322 122 32654	22	nF	63V	
2530	5322 122 32268	470	pF	50V	
2531	5322 122 32268	470	pF	50V	
2581	4822 122 33515	82	pF	63V	
2601	5322 122 31946	27	pF	50V	for VPS
2602	5322 121 42489	33	nF	250V	for VPS
2603	4822 124 80229	22	µF	16V	for VPS
2604	4822 122 33177	10	nF	50V	for VPS
2605	5322 121 42386	100	nF	63V	for VPS

RESISTORS

3104	4822 051 20472	4,7	kΩ	0,1W
3109	4822 051 20103	10	kΩ	0,1W
3110	4822 050 11002	1	kΩ	0,4W
3111	4822 051 10102	1	kΩ	0,25W
3112	4822 100 11843	10	kΩ	
3114	4822 051 20472	4,7	kΩ	0,1W
3115	4822 051 10102	1	kΩ	0,25W
3117	4822 050 11002	1	kΩ	0,4W
3118	4822 051 20103	10	kΩ	0,1W
3119	4822 051 20223	22	kΩ	0,1W
3120	4822 050 11002	1	kΩ	0,4W
3121	4822 051 20471	470	Ω	0,1W
3122	4822 051 20221	220	Ω	0,1W
3123	4822 051 20472	4,7	kΩ	0,1W
3124	4822 051 20393	39	kΩ	0,1W

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Family board LFBU

3125	4822 051 10102	1 kΩ 0,25W
3126	4822 051 20393	39 kΩ 0,1W
3127	4822 051 20393	39 kΩ 0,1W
3128	4822 116 52283	4,7 kΩ 0,5W
3129	4822 051 20472	4,7 kΩ 0,1W
3130	4822 051 20183	18 kΩ 0,1W
3131	4822 051 20103	10 kΩ 0,1W
3133	4822 051 20223	22 kΩ 0,1W
3134	4822 116 52199	68 Ω 0,5W
3135	4822 116 52199	68 Ω 0,5W
3136	4822 051 20472	4,7 kΩ 0,1W
3137	4822 051 20103	10 kΩ 0,1W
3138	4822 051 10102	1 kΩ 0,25W
3140	4822 051 20104	100 kΩ 0,1W
3141	4822 051 20225	2,2 MΩ 0,1W
3142	4822 051 20472	4,7 kΩ 0,1W
3143	4822 051 20103	10 kΩ 0,1W
3144	4822 051 20393	39 kΩ 0,1W
3145	4822 051 10102	1 kΩ 0,25W
3146	4822 051 10102	1 kΩ 0,25W
3147	4822 050 26808	6,8 Ω 0,6W
3148	4822 051 10102	1 kΩ 0,25W
3149	4822 116 52175	100 Ω 0,5W
3150	4822 051 20101	100 Ω 0,1W
3151	4822 050 26808	6,8 Ω 0,6W
3152	4822 051 20182	1,8 kΩ 0,1W
3153	4822 116 90801	Resistor Network 8x4,7kΩ
3154	4822 051 20103	10 kΩ 0,1W
3155	4822 051 20103	10 kΩ 0,1W
3156	4822 051 20103	10 kΩ 0,1W
3157	4822 051 20103	10 kΩ 0,1W
3158	4822 051 20563	56 kΩ 0,1W
3159	4822 051 20105	1 MΩ 0,1W
3160	4822 051 20472	4,7 kΩ 0,1W
3162	4822 051 20682	6,8 kΩ 0,1W
3163	4822 051 20103	10 kΩ 0,1W only for TPC
3164	4822 051 20103	10 kΩ 0,1W
3165	4822 051 20182	1,8 kΩ 0,1W
3166	4822 051 20472	4,7 kΩ 0,1W
3167	4822 051 20103	10 kΩ 0,1W
3168	4822 051 20103	10 kΩ 0,1W
3169	4822 051 10103	10 kΩ 0,25W
3170	4822 051 20472	4,7 kΩ 0,1W
3171	4822 051 20472	4,7 kΩ 0,1W
3173	4822 051 20472	4,7 kΩ 0,1W
3174	4822 051 20393	39 kΩ 0,1W
3181	4822 051 20471	470 Ω 0,1W
3182	4822 051 20104	100 kΩ 0,1W
3187	4822 051 20333	33 kΩ 0,1W
3188	4822 051 20103	10 kΩ 0,1W
3189	4822 051 10102	1 kΩ 0,25W
3190	4822 051 20393	39 kΩ 0,1W
3191	4822 051 10472	4,7 kΩ 0,25W
3201	4822 051 20332	3,3 kΩ 0,1W
3203	4822 051 20229	22 Ω 0,1W
3204	4822 051 20561	560 Ω 0,1W
3205	4822 051 20272	2,7 kΩ 0,1W
3206	4822 051 20332	3,3 kΩ 0,1W
3207	4822 116 52223	430 Ω 0,5W
3208	4822 116 52223	430 Ω 0,5W
3209	4822 051 20103	10 kΩ 0,1W
3210	4822 051 20223	22 kΩ 0,1W
3211	4822 051 10102	1 kΩ 0,25W
3212	4822 051 20471	470 Ω 0,1W
3213	4822 051 20152	1,5 kΩ 0,1W
3214	4822 051 20103	10 kΩ 0,1W
3215	4822 051 20471	470 Ω 0,1W
3216	4822 116 80676	1,5 Ω 0,2W
3217	4822 051 20473	47 kΩ 0,1W
3218	4822 101 11222	100 kΩ 0,1W
3219	4822 051 20333	33 kΩ 0,1W
3220	4822 116 80676	1,5 Ω 0,2W
3221	4822 051 20331	330 Ω 0,1W
3222	4822 051 20331	330 Ω 0,1W
3223	4822 051 20822	8,2 kΩ 0,1W
3224	4822 051 20222	2,2 kΩ 0,1W
3225	4822 051 10102	1 kΩ 0,25W
3226	4822 051 20223	22 kΩ 0,1W
3227	4822 051 20479	47 Ω 0,1W
3228	4822 051 20473	47 kΩ 0,1W
3229	4822 051 20104	100 kΩ 0,1W
3230	4822 051 20104	100 kΩ 0,1W
3231	4822 051 10102	1 kΩ 0,25W
3232	4822 051 20912	9,1 kΩ 0,1W
3233	4822 051 20152	1,5 kΩ 0,1W
3234	4822 051 20563	56 kΩ 0,1W
3235	4822 051 20105	1 MΩ 0,1W
3236	4822 051 20562	5,6 kΩ 0,1W
3237	4822 051 20123	12 kΩ 0,1W
3238	4822 100 11843	10 kΩ
3239	4822 051 20471	470 Ω 0,1W
3240	4822 051 20472	4,7 kΩ 0,1W
3242	4822 051 20332	3,3 kΩ 0,1W
3243	4822 051 20394	390 kΩ 0,1W
3244	4822 051 10431	430 Ω 0,25W
3501	4822 116 52175	100 Ω 0,5W
3502	4822 101 11221	470 Ω 0,1W
3503	4822 116 52201	75 Ω 0,5W
3505	4822 051 20101	100 Ω 0,1W
3506	4822 051 20224	220 kΩ 0,1W
3507	4822 051 20101	100 Ω 0,1W
3508	4822 051 20224	220 kΩ 0,1W
3509	4822 051 20101	100 Ω 0,1W
3510	4822 051 20224	220 kΩ 0,1W
3511	4822 051 20331	330 Ω 0,1W
3512	4822 051 10102	1 kΩ 0,25W
3513	4822 051 10562	5,6 kΩ 0,25W
3514	4822 051 20103	10 kΩ 0,1W
3515	4822 051 20101	100 Ω 0,1W
3516	4822 051 20224	220 kΩ 0,1W
3518	4822 051 20101	100 Ω 0,1W
3519	4822 051 20224	220 kΩ 0,1W
3521	4822 051 20101	100 Ω 0,1W
3522	4822 051 20224	220 kΩ 0,1W
3523	4822 051 20101	100 Ω 0,1W
3524	4822 051 20224	220 kΩ 0,1W
3525	4822 051 20101	100 Ω 0,1W
3526	4822 051 20224	220 kΩ 0,1W
3531	4822 051 20224	220 kΩ 0,1W
3538	4822 051 20473	47 kΩ 0,1W
3542	4822 051 10103	10 kΩ 0,25W
3543	4822 116 52284	47 kΩ 0,5W
3544	4822 051 20473	47 kΩ 0,1W
3545	4822 051 10102	1 kΩ 0,25W
3553	4822 051 10102	1 kΩ 0,25W
3554	4822 051 10102	1 kΩ 0,25W
3555	4822 051 20472	4,7 kΩ 0,1W
3556	4822 051 20472	4,7 kΩ 0,1W
3557	4822 116 52175	100 Ω 0,5W
3558	4822 116 52256	2,2 kΩ 0,5W
3559	4822 116 52256	2,2 kΩ 0,5W
3560	4822 051 20473	47 kΩ 0,1W
3561	4822 051 10102	1 kΩ 0,25W
3562	4822 051 20479	47 Ω 0,1W
3563	4822 051 20103	10 kΩ 0,1W
3564	4822 051 10102	1 kΩ 0,25W
3565	4822 051 20008	0 Ω 0,1W
3577	4822 051 20104	100 kΩ 0,1W
3581	4822 051 20682	6,8 kΩ 0,1W
3590	4822 051 20471	470 Ω 0,1W

$ ... Safety component, use only this type

Family board LFBU

3591	4822 051 20104	100 kΩ 0,1W
3601	4822 051 20332	3,3 kΩ 0,1W for VPS
3602	4822 051 20682	6,8 kΩ 0,1W for VPS
3603	4822 051 20105	1 MΩ 0,1W for VPS
3604	4822 051 20104	100 kΩ 0,1W for VPS
3605	4822 051 20105	1 MΩ 0,1W for VPS
3606	4822 051 20101	100 Ω 0,1W for VPS
3607	4822 051 20105	1 MΩ 0,1W for VPS
3608	4822 051 20562	5,6 kΩ 0,1W for VPS
3609	4822 051 10101	100 Ω 0,25W for VPS
3610	4822 051 10101	100 Ω 0,25W for VPS
3801	4822 051 20008	0 Ω 0,1W
3802	4822 051 20008	0 Ω 0,1W
3803	4822 051 10008	0 Ω 0,25W
3806	4822 051 10008	0 Ω 0,25W
3807	4822 051 10008	0 Ω 0,25W
3815	4822 051 10008	0 Ω 0,25W
3816	4822 051 10008	0 Ω 0,25W
3820	4822 051 10008	0 Ω 0,25W
9102	4822 051 10008	0R00 5% 0,25W
9200	4822 051 10008	0R00 5% 0,25W
9505	4822 051 20008	0R00 5% 0,1W
9507	4822 051 20008	0R00 5% 0,1W
9508	4822 051 20008	0R00 5% 0,1W
9509	4822 051 20008	0R00 5% 0,1W
9514	4822 051 20008	0R00 5% 0,1W
9515	4822 051 20008	0R00 5% 0,1W
9516	4822 051 20008	0R00 5% 0,1W
9518	4822 051 10008	0R00 5% 0,25W only for TPC
9519	4822 051 10008	0R00 5% 0,25W only for TPC

COILS

5102 $	4822 157 52286	22 µH
5104	4822 157 53252	22 µH
5105	4822 157 53252	22 µH
5201	4822 157 53249	
5202	4822 157 53531	
5203	4822 157 53531	
5501 $	4822 157 52285	6,8 µH

DIODES

6102	4822 130 34233	BZX79-B5V1
6103	4822 130 30621	1N4148
6106	4822 130 34278	BZX79-B6V8
6107	4822 130 30621	1N4148
6501	4822 130 34197	BZX79-B12
6502	4822 130 34197	BZX79-B12
6503	4822 130 34197	BZX79-B12
6504	4822 130 31024	BZX79-B18
6505	4822 130 30621	1N4148
6506	4822 130 34197	BZX79-B12
6507	4822 130 34197	BZX79-B12
6511	4822 130 34278	BZX79-B6V8
6513	5322 130 80406	BZX84-C6V8
6514	4822 130 30621	1N4148
6515	5322 130 80406	BZX84-C6V8
6516	5322 130 80406	BZX84-C6V8

TRANSISTORS & IC's

7010	4822 209 31836	IVC LUTD7
7020	5322 209 11102	HEF4052BT PHIN
7102	5322 209 61472	LM393M
7103	5322 130 41982	BC848B
7104	5322 130 41982	BC848B
7105	4822 209 30836	SAA1310/N2
7106	5322 130 41982	BC848B
7107	5322 130 41982	BC848B
7108	5322 130 41982	BC848B
7109	5322 130 41982	BC848B
7110	4822 130 60089	BD436
7111	4822 130 60089	BD436
7112	5322 130 41982	BC848B
7113	5322 130 41982	BC848B
7114	5322 130 41982	BC848B
7115	5322 130 41982	BC848B
7200	4822 209 60074	BA7766AS
7201	4822 130 41715	BC328-40
7202	4822 130 60145	DTC124E/25
7203	4822 130 42615	BC817-40
7204	5322 130 41983	BC858B
7205	4822 130 41344	BC337-40
7206	4822 130 60145	DTC124E/25
7207	5322 130 41982	BC848B
7501	5322 130 41983	BC858B
7502	5322 130 41982	BC848B
7503	5322 209 14481	HEF4053BT
7504	4822 209 10263	HEF4052BP
7505	4822 209 10263	HEF4052BP
7506	5322 209 14481	HEF4053BT
7508	5322 130 41983	BC858B
7510	4822 209 31527	BA7613N
7511	4822 209 31527	BA7613N
7512	4822 130 41715	BC328-40
7513	5322 209 10421	HEF4094BD
7514	5322 130 41982	BC848B
7516	4822 130 60145	DTC124E/25
7517	5322 130 41982	BC848B
7518	5322 130 41982	BC848B
7519	5322 130 41982	BC848B
7520	5322 130 41982	BC848B
7601	4822 209 73306	SDA5642 for VPS

Scart print LSC

$	4822 214 33649	LSC

Synchro edit LES

$	4822 214 33648	LES

$ ... Safety component, use only this type

Signal panel PMS for PAL

CONNECTORS

	4822 267 41063	6 pin
	4822 290 81463	7 pin
	4822 321 22318	11 pin

MISCELLANEOUS

1601	4822 242 81067	Crystal 4.433 619 MHz
1602 $	4822 071 55001	Fuse 500mA
1603	4822 320 40168	Delay line
1604	4822 320 40096	Delay line DL 701 for LP

CAPACITORS

2000	5322 122 31946	27 pF 50V
2001	5322 122 32269	6,8 pF 50V
2002	4822 126 10326	180 pF
2003	4822 122 32575	220 pF 500V
2004	5322 122 32965	18 pF 50V
2009	4822 124 40435	10 µF 50V
2010	5322 122 34123	1 nF 50V
2011	4822 124 40435	10 µF 50V
2012	4822 124 42006	1 µF 50V
2013	5322 122 32531	100 pF 50V
2014	5322 122 32452	47 pF 63V
2015	4822 122 33177	10 nF 50V
2016	4822 122 31947	100 nF 63V
2017	4822 126 10004	120 pF 63V
2018	5322 122 32531	100 pF 50V
2019	4822 126 10004	120 pF 63V
2020	5322 122 32269	6,8 pF 50V
2021	4822 124 41643	100 µF 16V
2022	4822 124 41506	47 µF 16V
2023	4822 124 22263	47 16V
2024	4822 124 41506	47 µF 16V
2025	5322 122 32654	22 nF 63V
2026	5322 122 32531	100 pF 50V
2027	4822 122 33515	82 pF 63V
2028	4822 126 10004	120 pF 63V
2029	5322 122 32452	47 pF 63V
2030	4822 122 33177	10 nF 50V
2031	4822 122 31947	100 nF 63V
2032	4822 124 40242	1 µF 63V
2033	4822 126 10004	120 pF 63V
2034	5322 122 32654	22 nF 63V
2035	4822 124 40242	1 µF 63V
2036	5322 122 34123	1 nF 50V
2037	5322 122 32452	47 pF 63V for LP
2038	5322 122 32966	39 pF 50V
2039	5322 122 31946	27 pF 50V
2040	4822 124 41506	47 µF 16V
2041	4822 124 41506	47 µF 16V
2042	4822 122 31947	100 nF 63V
2043	5322 122 32654	22 nF 63V
2045	4822 122 33177	10 nF 50V
2046	4822 124 40242	1 µF 63V
2047	4822 124 80176	1 µF 50V
2048	4822 122 32542	47 nF 63V
2050	5322 122 31946	27 pF 50V
2051	5322 122 34123	1 nF 50V for LP
2052	4822 124 40435	10 µF 50V
2053	5322 122 34123	1 nF 50V for LP
2054	4822 122 32542	47 nF 63V for LP
2055	4822 122 31947	100 nF 63V
2056	4822 122 32542	47 nF 63V
2057	4822 122 32542	47 nF 63V
2058	4822 124 40242	1 µF 63V
2059	4822 124 40242	1 µF 63V
2060	5322 122 34123	1 nF 50V
2061	5322 122 34123	1 nF 50V
2062	4822 122 33177	10 nF 50V
2063	5322 122 34123	1 nF 50V
2064	4822 122 31947	100 nF 63V
2065	5322 122 32269	6,8 pF 50V
2066	5322 122 31946	27 pF 50V
2067	5322 122 32659	33 pF 50V
2068	5322 122 32269	6,8 pF 50V
2069	5322 122 31946	27 pF 50V
2070	5322 122 32269	6,8 pF 50V
2071	5322 122 32452	47 pF 63V
2072	5322 122 34123	1 nF 50V
2079	4822 122 33177	10 nF 50V
2080	5322 122 34123	1 nF 50V
2087	5322 122 31863	330 pF 50V
2088	4822 122 31947	100 nF 63V
2089	4822 124 41506	47 µF 16V
2091	4822 122 33177	10 nF 50V
2095	5322 122 32452	47 pF 63V
2096	5322 122 32452	47 pF 63V
2097	5322 122 32287	4,7 pF 50V
2101	4822 126 10004	120 pF 63V
2105	5322 122 32654	22 nF 63V
2106	5322 122 32481	15 pF 50V
2211	5322 122 32452	47 pF 63V for LP
2300	5322 122 34123	1 nF 50V
2301	5322 122 34123	1 nF 50V for LP

RESISTORS

3001	4822 051 20471	470 Ω 0,1W
3007	4822 051 20479	47 Ω 0,1W
3008	4822 051 20223	22 kΩ 0,1W
3010	4822 100 11842	4,7 kΩ
3012	4822 051 20332	3,3 kΩ 0,1W
3016	4822 051 20223	22 kΩ 0,1W
3017	4822 051 20103	10 kΩ 0,1W
3018	4822 100 11842	4,7 kΩ
3019	4822 051 20562	5,6 kΩ 0,1W
3020	4822 100 11842	4,7 kΩ
3021	4822 051 20912	9,1 kΩ 0,1W
3022	4822 051 20222	2,2 kΩ 0,1W
3023	4822 051 10102	1 kΩ 0,25W
3024	4822 051 20222	2,2 kΩ 0,1W for LP
3025	4822 051 20104	100 kΩ 0,1W
3026	4822 051 20472	4,7 kΩ 0,1W
3027	4822 051 20681	680 Ω 0,1W
3028	4822 051 20682	6,8 kΩ 0,1W
3029	4822 051 20472	4,7 kΩ 0,1W
3030	4822 051 20222	2,2 kΩ 0,1W
3031	4822 051 20333	33 kΩ 0,1W
3032	4822 051 20273	27 kΩ 0,1W
3033	4822 051 10102	1 kΩ 0,25W
3034	4822 051 20222	2,2 kΩ 0,1W
3035	4822 051 20103	10 kΩ 0,1W for NTSC Pb
3036	4822 051 20472	4,7 kΩ 0,1W
3037	4822 051 20152	1,5 kΩ 0,1W
3038	4822 051 20472	4,7 kΩ 0,1W
3039	4822 100 11843	10 kΩ
3040	4822 051 20222	2,2 kΩ 0,1W
3041	4822 051 20472	4,7 kΩ 0,1W
3042	4822 051 10102	1 kΩ 0,25W
3043	4822 051 20561	560 Ω 0,1W
3044	4822 051 10102	1 kΩ 0,25W
3045	4822 051 20472	4,7 kΩ 0,1W
3046	4822 051 20222	2,2 kΩ 0,1W
3047	4822 051 20473	47 kΩ 0,1W
3048	4822 051 20473	47 kΩ 0,1W
3049	4822 051 20473	47 kΩ 0,1W

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Signal panel PMS for PAL

3050	4822 051 20104	100 kΩ 0,1W
3051	4822 051 20105	1 MΩ 0,1W
3052	4822 051 20822	8,2 kΩ 0,1W
3053	4822 051 20222	2,2 kΩ 0,1W
3054	4822 051 20223	22 kΩ 0,1W for LP
3055	4822 051 20821	820 Ω 0,1W
3056	4822 051 20471	470 Ω 0,1W
3057	4822 051 20103	10 kΩ 0,1W for LP
3058	4822 051 20273	27 kΩ 0,1W
3060	4822 051 20333	33 kΩ 0,1W
3061	4822 051 20103	10 kΩ 0,1W
3062	4822 051 20182	1,8 kΩ 0,1W
3063	4822 051 20271	270 Ω 0,1W
3064	4822 051 20561	560 Ω 0,1W
3065	4822 051 10102	1 kΩ 0,25W
3066	4822 051 20122	1,2 kΩ 0,1W
3067	4822 051 20391	390 Ω 0,1W
3068	4822 051 10102	1 kΩ 0,25W
3069	4822 051 20561	560 Ω 0,1W
3070	4822 051 20391	390 Ω 0,1W
3071	4822 051 20681	680 Ω 0,1W
3072	4822 051 20271	270 Ω 0,1W
3073	4822 051 10102	1 kΩ 0,25W
3075	4822 051 20471	470 Ω 0,1W
3076	4822 051 20331	330 Ω 0,1W
3077	4822 051 20183	18 kΩ 0,1W
3078	4822 051 20183	18 kΩ 0,1W
3089	4822 051 10102	1 kΩ 0,25W
3090	4822 051 10102	1 kΩ 0,25W
3091	4822 051 20562	5,6 kΩ 0,1W
3092	4822 051 20332	3,3 kΩ 0,1W
3093	4822 051 20152	1,5 kΩ 0,1W
3094	4822 051 20222	2,2 kΩ 0,1W
3096	4822 100 11842	4,7 kΩ
3097	4822 051 20222	2,2 kΩ 0,1W
3100	4822 051 10102	1 kΩ 0,25W
3104	4822 051 20472	4,7 kΩ 0,1W
3105	4822 051 20152	1,5 kΩ 0,1W
3106	4822 051 20271	270 Ω 0,1W
3107	4822 051 20472	4,7 kΩ 0,1W
3108	4822 051 20472	4,7 kΩ 0,1W
3109	4822 051 20561	560 Ω 0,1W
3110	4822 051 20471	470 Ω 0,1W for LP
3111	4822 051 20471	470 Ω 0,1W
3112	4822 051 20222	2,2 kΩ 0,1W
3113	4822 051 20104	100 kΩ 0,1W
3114	4822 051 20103	10 kΩ 0,1W for LP
3117	4822 051 20183	18 kΩ 0,1W
3118	4822 051 10102	1 kΩ 0,25W
3119	4822 051 20101	100 Ω 0,1W
3120	4822 051 20333	33 kΩ 0,1W
3128	4822 051 20223	22 kΩ 0,1W
3131	4822 051 20479	47 Ω 0,1W
3132	4822 051 20681	680 Ω 0,1W
3133	4822 051 20104	100 kΩ 0,1W for LP
3134	4822 051 20104	100 kΩ 0,1W for NTSC Pb
3135	4822 051 20104	100 kΩ 0,1W
3300	4822 051 10102	1 kΩ 0,25W
3301	4822 051 20391	390 Ω 0,1W for LP
3302	4822 051 20101	100 Ω 0,1W for LP
3303	4822 101 11221	470 Ω 0,1W for LP
3304	4822 051 20152	1,5 kΩ 0,1W for LP
3305	4822 051 20332	3,3 kΩ 0,1W for LP
3306	4822 051 20152	1,5 kΩ 0,1W for LP
3906	4822 051 10008	0 Ω 0,25W
3920	4822 051 10008	0 Ω 0,25W
3921	4822 051 10008	0 Ω 0,25W
3923	4822 051 10008	0 Ω 0,25W
3924	4822 051 10008	0 Ω 0,25W
3925	4822 051 10008	0 Ω 0,25W
3926	4822 051 10008	0 Ω 0,25W
3927	4822 051 10008	0 Ω 0,25W
3999	4822 051 20008	0 Ω 0,1W

COILS

5002	4822 157 53253	27 µH
5003	4822 157 53265	100 µH
5004	4822 157 52842	15 µH
5006	4822 157 53251	8,2 µH
5008	4822 157 53251	8,2 µH
5009	4822 157 52842	15 µH
5010	4822 157 53253	27 µH
5011	4822 157 52842	15 µH
5012	4822 157 53265	100 µH
5013	4822 157 52842	15 µH
5014	4822 157 53251	8,2 µH
5015	4822 157 63676	56MUH
5016	4822 157 53253	27 µH
5017	4822 157 63676	56MUH
5020	4822 157 52842	15 µH
5021	4822 157 52842	15 µH
5022	4822 157 52842	15 µH
5023	4822 157 63675	330MUH
5024	4822 157 63678	560MUH
5025	4822 157 53253	27 µH
5301	4822 157 53251	8,2 µH for LP
5302	4822 157 53251	8,2 µH for LP

DIODES

6002	4822 130 31983	BAT85
6003	4822 130 30621	1N4148
6005	4822 130 30621	1N4148
6006	5322 130 34331	BAV70 for LP

TRANSISTORS & IC's

7000	5322 130 41983	BC858B
7001	5322 130 41982	BC848B for LP
7002	4822 130 60145	DTC124E/25 for NTSC Pb
7004	5322 130 41983	BC858B
7005	5322 130 41982	BC848B
7006	5322 130 41983	BC858B
7007	5322 130 41982	BC848B
7009	5322 130 41982	BC848B for LP
7012	5322 130 41982	BC848B
7013	5322 130 41982	BC848B for LP
7015	5322 130 41982	BC848B
7016	5322 130 41982	BC848B
7017	4822 130 42353	BSF19-F2
7018	4822 130 60383	BF824
7019	4822 130 42353	BSF19-F2
7020	4822 130 60145	DTC124E/25 for LP
7025	5322 130 41982	BC848B
7026	5322 130 41982	BC848B
7027	5322 130 41982	BC848B
7028	5322 130 41982	BC848B
7029	5322 130 41982	BC848B
7030	4822 130 42353	BSF19-F2
7031	5322 130 41982	BC848B
7032	5322 130 41982	BC848B
7036	5322 130 41982	BC848B
7038	5322 130 41983	BC858B
7039	4822 130 60145	DTC124E/25 for LP
7042	4822 130 61495	DTA124EK
7043	4822 130 60145	DTC124E/25 for LP
7301	5322 130 41982	BC848B for LP
7302	5322 130 41982	BC848B for LP

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Signal panel PMS for PAL

7303	4822 130 42353	BSF19-F2 for LP
7304	5322 130 41982	BC848B for LP
7501	4822 209 30691	LA7391A
7503	4822 209 60177	LM339D
7504	4822 209 30692	MSM7403RS

NTSC sub PCB

$	4822 214 33699	NTSC PCB

Signal panel PMS for SECAM

CONNECTORS

4822 290 81463	7 pin
4822 321 22318	11 pin

MISCELLANEOUS

1601	4822 242 81067	Crystal 4.433 619 MHz
1602 $	4822 071 55001	Fuse 500mA
1603	4822 320 40168	Delay line
1604	4822 320 40096	Delay line DL 701 for LP

CAPACITORS

2000	5322 122 31946	27 pF 50V
2001	5322 122 32269	6,8 pF 50V
2002	4822 126 10326	180 pF
2003	4822 122 32575	220 pF 500V
2004	5322 122 32965	18 pF 50V
2009	4822 124 40435	10 µF 50V
2010	5322 122 34123	1 nF 50V
2011	4822 124 40435	10 µF 50V
2012	4822 124 42006	1 µF 50V
2013	5322 122 32531	100 pF 50V
2014	5322 122 32452	47 pF 63V
2015	4822 122 33177	10 nF 50V
2016	4822 122 31947	100 nF 63V
2017	4822 126 10004	120 pF 63V
2018	5322 122 32531	100 pF 50V
2019	4822 126 10004	120 pF 63V
2020	5322 122 32269	6,8 pF 50V
2021	4822 124 41643	100 µF 16V
2022	4822 124 41506	47 µF 16V
2023	4822 124 22263	47 16V
2024	4822 124 41506	47 µF 16V
2025	5322 122 32654	22 nF 63V
2026	5322 122 32531	100 pF 50V
2027	4822 122 33515	82 pF 63V
2028	4822 126 10004	120 pF 63V
2029	5322 122 32452	47 pF 63V
2030	4822 122 33177	10 nF 50V
2031	4822 122 31947	100 nF 63V
2032	4822 124 40242	1 µF 63V
2033	4822 126 10004	120 pF 63V
2034	5322 122 32654	22 nF 63V
2035	4822 124 40242	1 µF 63V
2036	5322 122 34123	1 nF 50V
2037	5322 122 32452	47 pF 63V for LP
2038	5322 122 32966	39 pF 50V
2039	5322 122 31946	27 pF 50V
2040	4822 124 41506	47 µF 16V
2041	4822 124 41506	47 µF 16V
2042	4822 122 31947	100 nF 63V
2043	5322 122 32654	22 nF 63V
2045	4822 122 33177	10 nF 50V
2046	4822 124 40242	1 µF 63V
2047	4822 124 40242	1 µF 63V
2048	4822 122 32542	47 nF 63V
2050	5322 122 31946	27 pF 50V
2051	5322 122 34123	1 nF 50V for LP
2052	4822 124 40435	10 µF 50V
2053	5322 122 34123	1 nF 50V for LP
2054	4822 122 32542	47 nF 63V for LP
2055	4822 122 31947	100 nF 63V
2056	4822 122 32542	47 nF 63V
2057	4822 122 32542	47 nF 63V
2058	4822 124 40242	1 µF 63V
2059	4822 124 40242	1 µF 63V
2060	5322 122 34123	1 nF 50V
2061	5322 122 34123	1 nF 50V
2062	4822 122 33177	10 nF 50V
2063	5322 122 34123	1 nF 50V
2064	4822 122 31947	100 nF 63V
2065	5322 122 32269	6,8 pF 50V
2066	5322 122 31946	27 pF 50V
2067	5322 122 32659	33 pF 50V
2068	5322 122 32269	6,8 pF 50V
2069	5322 122 31946	27 pF 50V
2070	5322 122 32269	6,8 pF 50V
2071	5322 122 32452	47 pF 63V
2072	5322 122 34123	1 nF 50V
2079	4822 122 33177	10 nF 50V
2080	5322 122 34123	1 nF 50V
2087	5322 122 31863	330 pF 50V
2088	4822 122 31947	100 nF 63V
2089	4822 124 41506	47 µF 16V
2091	4822 122 33177	10 nF 50V
2095	5322 122 32452	47 pF 63V
2096	5322 122 32452	47 pF 63V
2097	5322 122 32287	4,7 pF 50V
2101	4822 126 10004	120 pF 63V
2105	5322 122 32654	22 nF 63V
2106	5322 122 32481	15 pF 50V
2200	4822 122 33177	10 nF 50V
2201	5322 122 32658	22 pF 50V
2202	5322 122 34123	1 nF 50V
2203	5322 122 32531	100 pF 50V
2204	4822 122 33177	10 nF 50V
2205	5322 122 34123	1 nF 50V
2206	5322 122 31946	27 pF 50V
2207	4822 122 33177	10 nF 50V
2208	4822 122 33177	10 nF 50V
2209	4822 122 31947	100 nF 63V
2210	4822 122 33177	10 nF 50V
2211	5322 122 32452	47 pF 63V for LP
2212	4822 122 33177	10 nF 50V
2213	5322 122 34123	1 nF 50V
2214	4822 122 31947	100 nF 63V
2216	4822 122 32575	220 pF 500V
2217	4822 122 31947	100 nF 63V
2218	4822 122 31947	100 nF 63V
2219	4822 122 33177	10 nF 50V
2220	4822 122 33177	10 nF 50V
2221	4822 124 41506	47 µF 16V
2222	5322 122 32658	22 pF 50V
2223	4822 122 33515	82 pF 63V
2224	5322 122 32269	6,8 pF 50V
2225	4822 122 33177	10 nF 50V
2300	5322 122 34123	1 nF 50V
2301	5322 122 34123	1 nF 50V

$ ... Safety component, use only this type

For Service Manuals Contact
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8 Cherry Tree Rd, Chinnor
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Tel:- 01844-351354 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

Signal panel PMS for SECAM

RESISTORS

3001	4822 051 20471	470 Ω	0,1W
3007	4822 051 20479	47 Ω	0,1W
3008	4822 051 20223	22 kΩ	0,1W
3010	4822 100 11842	4,7 kΩ	
3011	4822 051 20153	15 kΩ	0,1W
3011	4822 051 20183	18 kΩ	0,1W for LP
3012	4822 051 20332	3,3 kΩ	0,1W
3016	4822 051 20223	22 kΩ	0,1W
3017	4822 051 20103	10 kΩ	0,1W
3018	4822 100 11842	4,7 kΩ	
3019	4822 051 20562	5,6 kΩ	0,1W
3020	4822 100 11842	4,7 kΩ	
3021	4822 051 20912	9,1 kΩ	0,1W
3022	4822 051 20222	2,2 kΩ	0,1W
3023	4822 051 10102	1 kΩ	0,25W
3025	4822 051 20104	100 kΩ	0,1W
3024	4822 051 20222	2,2 kΩ	0,1W for LP
3026	4822 051 20472	4,7 kΩ	0,1W
3027	4822 051 20681	680 Ω	0,1W
3028	4822 051 20682	6,8 kΩ	0,1W
3029	4822 051 20472	4,7 kΩ	0,1W
3030	4822 051 20222	2,2 kΩ	0,1W
3031	4822 051 20333	33 kΩ	0,1W
3032	4822 051 20273	27 kΩ	0,1W
3033	4822 051 10102	1 kΩ	0,25W
3034	4822 051 20222	2,2 kΩ	0,1W
3036	4822 051 20472	4,7 kΩ	0,1W
3037	4822 051 20152	1,5 kΩ	0,1W
3038	4822 051 20472	4,7 kΩ	0,1W
3039	4822 100 11843	10 kΩ	
3040	4822 051 20222	2,2 kΩ	0,1W
3041	4822 051 20472	4,7 kΩ	0,1W
3042	4822 051 10102	1 kΩ	0,25W
3043	4822 051 20561	560 Ω	0,1W
3044	4822 051 10102	1 kΩ	0,25W
3045	4822 051 20472	4,7 kΩ	0,1W
3046	4822 051 20222	2,2 kΩ	0,1W
3047	4822 051 20473	47 kΩ	0,1W
3048	4822 051 20473	47 kΩ	0,1W
3049	4822 051 20473	47 kΩ	0,1W
3050	4822 051 20104	100 kΩ	0,1W
3051	4822 051 20105	1 MΩ	0,1W
3052	4822 051 20822	8,2 kΩ	0,1W
3053	4822 051 20222	2,2 kΩ	0,1W
3054	4822 051 20223	22 kΩ	0,1W for LP
3055	4822 051 20821	820 Ω	0,1W
3056	4822 051 20471	470 Ω	0,1W
3057	4822 051 20103	10 kΩ	0,1W for LP
3058	4822 051 20333	33 kΩ	0,1W
3058	4822 051 20273	27 kΩ	0,1W for LP
3060	4822 051 20333	33 kΩ	0,1W
3061	4822 051 20103	10 kΩ	0,1W
3062	4822 051 20182	1,8 kΩ	0,1W
3063	4822 051 20271	270 Ω	0,1W
3064	4822 051 20561	560 Ω	0,1W
3065	4822 051 10102	1 kΩ	0,25W
3066	4822 051 20122	1,2 kΩ	0,1W
3067	4822 051 20391	390 Ω	0,1W
3068	4822 051 10102	1 kΩ	0,25W
3069	4822 051 20561	560 Ω	0,1W
3070	4822 051 20391	390 Ω	0,1W
3071	4822 051 20681	680 Ω	0,1W
3072	4822 051 20271	270 Ω	0,1W
3073	4822 051 10102	1 kΩ	0,25W
3075	4822 051 20471	470 Ω	0,1W
3076	4822 051 20331	330 Ω	0,1W
3077	4822 051 20183	18 kΩ	0,1W
3078	4822 051 20183	18 kΩ	0,1W
3089	4822 051 10102	1 kΩ	0,25W
3090	4822 051 10102	1 kΩ	0,25W
3091	4822 051 20562	5,6 kΩ	0,1W
3092	4822 051 20332	3,3 kΩ	0,1W
3093	4822 051 20152	1,5 kΩ	0,1W
3094	4822 051 20222	2,2 kΩ	0,1W
3096	4822 100 11842	4,7 kΩ	
3097	4822 051 20222	2,2 kΩ	0,1W
3100	4822 051 10102	1 kΩ	0,25W
3101	4822 051 20272	2,7 kΩ	0,1W
3102	4822 100 11842	4,7 kΩ	
3104	4822 051 20472	4,7 kΩ	0,1W
3105	4822 051 20152	1,5 kΩ	0,1W
3106	4822 051 20271	270 Ω	0,1W
3107	4822 051 20472	4,7 kΩ	0,1W
3108	4822 051 20472	4,7 kΩ	0,1W
3109	4822 051 20561	560 Ω	0,1W
3110	4822 051 20471	470 Ω	0,1W for LP
3111	4822 051 20471	470 Ω	0,1W
3112	4822 051 20222	2,2 kΩ	0,1W
3113	4822 051 20104	100 kΩ	0,1W
3114	4822 051 20333	33 kΩ	0,1W for LP
3114	4822 051 20103	10 kΩ	0,1W
3117	4822 051 20183	18 kΩ	0,1W
3118	4822 051 10102	1 kΩ	0,25W
3119	4822 051 20101	100 Ω	0,1W
3120	4822 051 20333	33 kΩ	0,1W
3128	4822 051 20223	22 kΩ	0,1W
3131	4822 051 20479	47 Ω	0,1W
3132	4822 051 20681	680 Ω	0,1W
3133	4822 051 20104	100 kΩ	0,1W for LP
3135	4822 051 20104	100 kΩ	0,1W
3200	4822 051 20331	330 Ω	0,1W
3201	4822 051 20332	3,3 kΩ	0,1W
3202	4822 051 20821	820 Ω	0,1W
3203	4822 051 20681	680 Ω	0,1W
3204	4822 051 10102	1 kΩ	0,25W
3205	4822 051 20391	390 Ω	0,1W
3206	4822 051 20821	820 Ω	0,1W
3207	4822 051 10102	1 kΩ	0,25W
3208	4822 051 10102	1 kΩ	0,25W
3209	4822 051 20152	1,5 kΩ	0,1W
3211	4822 051 10102	1 kΩ	0,25W
3212	4822 051 20152	1,5 kΩ	0,1W
3213	4822 051 20103	10 kΩ	0,1W
3214	4822 051 20333	33 kΩ	0,1W
3220	4822 051 20104	100 kΩ	0,1W
3221	4822 051 20222	2,2 kΩ	0,1W
3222	4822 051 20104	100 kΩ	0,1W
3224	4822 051 20222	2,2 kΩ	0,1W
3225	4822 051 10102	1 kΩ	0,25W
3226	4822 051 20183	18 kΩ	0,1W
3227	4822 051 20222	2,2 kΩ	0,1W
3228	4822 051 20152	1,5 kΩ	0,1W
3229	4822 051 20103	10 kΩ	0,1W
3232	4822 051 10102	1 kΩ	0,25W
3233	4822 051 20561	560 Ω	0,1W
3234	4822 051 20472	4,7 kΩ	0,1W
3237	4822 051 20103	10 kΩ	0,1W
3238	4822 051 20103	10 kΩ	0,1W
3239	4822 051 20103	10 kΩ	0,1W
3240	4822 051 10102	1 kΩ	0,25W
3241	4822 051 20104	100 kΩ	0,1W
3242	4822 051 20104	100 kΩ	0,1W
3300	4822 051 10102	1 kΩ	0,25W
3301	4822 051 20391	390 Ω	0,1W for LP
3302	4822 051 20101	100 Ω	0,1W for LP
3303	4822 101 11221	470 Ω	0,1W for LP
3304	4822 051 20152	1,5 kΩ	0,1W for LP
3305	4822 051 20332	3,3 kΩ	0,1W for LP

$ ... Safety component, use only this type

Signal panel PMS for SECAM

3306	4822 051 20152	1,5 kΩ 0,1W for LP
3906	4822 051 10008	0 Ω 0,25W
3910	4822 051 10008	0 Ω 0,25W
3920	4822 051 10008	0 Ω 0,25W
3921	4822 051 10008	0 Ω 0,25W
3923	4822 051 10008	0 Ω 0,25W
3924	4822 051 10008	0 Ω 0,25W
3925	4822 051 10008	0 Ω 0,25W
3926	4822 051 10008	0 Ω 0,25W
3927	4822 051 10008	0 Ω 0,25W

COILS

5002	4822 157 53253	27 µH
5003	4822 157 53265	100 µH
5004	4822 157 52842	15 µH
5006	4822 157 53251	8,2 µH
5008	4822 157 53251	8,2 µH
5009	4822 157 52842	15 µH
5010	4822 157 53253	27 µH
5011	4822 157 52842	15 µH
5012	4822 157 53265	100 µH
5013	4822 157 52842	15 µH
5014	4822 157 53251	8,2 µH
5015	4822 157 63676	56MUH
5016	4822 157 53253	27 µH
5017	4822 157 63676	56MUH
5020	4822 157 52842	15 µH
5021	4822 157 52842	15 µH
5022	4822 157 52842	15 µH
5023	4822 157 63675	330MUH
5024	4822 157 63678	560MUH
5025	4822 157 53253	27 µH
5201	4822 157 63661	
5202	4822 157 63661	
5203	4822 157 63676	56MUH
5204	4822 157 52842	15 µH
5205	4822 157 63675	330MUH
5207	4822 157 63659	
5209	4822 156 21456	ASSY
5210	4822 157 52842	15 µH
5211	4822 156 21459	ASSY
5213	4822 157 63678	560MUH
5214	4822 157 53265	100 µH
5301	4822 157 53251	8,2 µH for LP
5302	4822 157 53251	8,2 µH for LP

DIODES

6002	4822 130 31983	BAT85
6003	4822 130 30621	1N4148
6005	4822 130 30621	1N4148
6006	5322 130 34331	BAV70 for LP

TRANSISTORS & IC's

7000	5322 130 41983	BC858B
7001	5322 130 41982	BC848B
7004	5322 130 41983	BC858B
7005	5322 130 41982	BC848B
7006	5322 130 41983	BC858B
7007	5322 130 41982	BC848B
7009	5322 130 41982	BC848B for LP
7012	5322 130 41982	BC848B
7013	5322 130 41982	BC848B for LP
7015	5322 130 41982	BC848B
7016	5322 130 41982	BC848B
7017	4822 130 42353	BSF19-F2
7018	4822 130 60383	BF824
7019	4822 130 42353	BSF19-F2
7020	4822 130 60145	DTC124E/25 for LP
7025	5322 130 41982	BC848B
7026	5322 130 41982	BC848B
7027	5322 130 41982	BC848B
7028	5322 130 41982	BC848B
7029	5322 130 41982	BC848B
7030	4822 130 42353	BSF19-F2
7031	5322 130 41982	BC848B
7032	5322 130 41982	BC848B
7036	5322 130 41982	BC848B
7038	5322 130 41983	BC858B
7039	4822 130 60145	DTC124E/25 for LP
7043	4822 130 60145	DTC124E/25 for LP
7200	4822 130 42353	BSF19-F2
7201	5322 130 41982	BC848B
7202	4822 209 73852	PMBT2369
7203	5322 130 41982	BC848B
7205	5322 130 41982	BC848B
7207	4822 130 60145	DTC124E/25
7301	5322 130 41982	BC848B for LP
7302	5322 130 41982	BC848B for LP
7303	4822 130 42353	BSF19-F2 for LP
7304	5322 130 41982	BC848B for LP
7501	4822 209 30691	LA7391A
7503	4822 209 60177	LM339D
7504	4822 209 30692	MSM7403RS
7520	4822 209 73599	TDA4725/V2
7521	4822 209 63098	TC4052BFN
7522	5322 209 61472	LM393M

$ ... Safety component, use only this type

FM-Audio/Front end LAF

CONNECTORS

	4822 266 40158	7 pin
	4822 267 50721	9 pin

MISCELLANEOUS

1050	4822 242 81258	Bandpass filter
1701	4822 210 10392	Tuner UV916E
1701	4822 210 10393	Tuner U944/PHONO for PAL I
1720	4822 242 80295	OFWG3962M
1720	4822 242 80293	OFWG3963M for PAL I
1721	4822 242 81259	OFWK6256 for SECAM L
1722	4822 242 72578	SFT6,0B for PAL I
1722	4822 242 72086	TPS5,5MB
1760	4822 214 33713	Modulator
1760	4822 214 33718	Modulator MDLK6B776A for PAL I
1760	4822 214 33417	Modulator for SECAM L
1761	4822 157 60192	Coil
1780	4822 242 73809	Crystal 10 MHz
1820	4822 242 80303	OFWG9251M
1820	4822 242 73796	OFWG9201 for PAL I
1821	4822 242 81157	OFWL9453 for SECAM L
1822	4822 242 72577	SFE6,0MB for PAL I
1822	4822 242 72914	SFSH5,5MDB-TF21
1824	4822 242 81257	SFE5,74MC-TP21
1860 $	4822 071 53151	Fuse 315mA
1861 $	4822 071 53151	Fuse 315mA

CAPACITORS

2003	4822 122 31947	100 nF 63V
2004	4822 122 31947	100 nF 63V
2005	5322 122 32268	470 pF 50V
2006	4822 122 31765	100 pF 50V
2007	4822 124 41576	2,2 µF 50V
2008	5322 122 33446	3,3 nF 63V
2009	4822 124 41576	2,2 µF 50V
2011	4822 124 41576	2,2 µF 50V
2013	4822 124 80226	10 µF 35V
2015	4822 124 80232	22 µF 16V
2016	5322 126 10223	4,7 nF 63V
2017	4822 122 32927	220 nF
2020	4822 124 40435	10 µF 50V
2024	4822 124 41576	2,2 µF 50V
2103	4822 122 31947	100 nF 63V
2104	4822 122 31947	100 nF 63V
2105	5322 122 32268	470 pF 50V
2106	4822 122 31765	100 pF 50V
2107	4822 124 41576	2,2 µF 50V
2108	5322 122 33446	3,3 nF 63V
2109	4822 124 41576	2,2 µF 50V
2111	4822 124 41576	2,2 µF 50V
2113	4822 124 80226	10 µF 35V
2115	4822 124 80232	22 µF 16V
2116	5322 126 10223	4,7 nF 63V
2117	4822 122 32927	220 nF
2120	4822 124 40435	10 µF 50V
2124	4822 124 41576	2,2 µF 50V
2200	4822 122 31797	22 nF 63V
2201	4822 122 31797	22 nF 63V
2202	4822 122 31772	47 pF 50V
2203	4822 122 31765	100 pF 50V
2204	4822 122 31797	22 nF 63V
2205	4822 124 80232	22 µF 16V
2206	4822 122 31775	680 pF 50V
2208	4822 122 31797	22 nF 63V
2209	4822 124 41643	100 µF 16V
2211	4822 124 41643	100 µF 16V
2212	4822 122 32927	220 nF
2213	4822 122 32927	220 nF
2214	4822 124 40435	10 µF 50V
2215	4822 122 31797	22 nF 63V
2216	4822 124 40435	10 µF 50V
2218	4822 122 31797	22 nF 63V
2220	4822 124 80232	22 µF 16V
2700	4822 122 31947	100 nF 63V
2701	4822 122 31947	100 nF 63V
2702	4822 122 31797	22 nF 63V
2720	4822 122 31797	22 nF 63V
2721	4822 122 31797	22 nF 63V for SECAM L
2722	4822 124 80232	22 µF 16V
2723	4822 124 80232	22 µF 16V for SECAM L
2724	4822 124 80227	2,2 µF 35V
2725	4822 122 31797	22 nF 63V
2726	4822 122 32542	47 nF 63V
2727	4822 122 31797	22 nF 63V for SECAM L
2728	4822 122 31797	22 nF 63V for SECAM L
2730	4822 122 32927	220 nF
2731	4822 124 80232	22 µF 16V
2732	4822 122 31947	100 nF 63V
2733	4822 122 31797	22 nF 63V for SECAM L
2734	5322 121 42661	330 nF 63V
2735	4822 122 32927	220 nF
2736	4822 121 51319	1 µF 63V
2737	4822 122 32506	5,6 pF 50V
2738	4822 122 31792	1,5 pF 50V for SECAM L
2760	4822 122 32927	220 nF
2761	4822 122 32504	15 pF 50V
2762	4822 122 32927	220 nF
2770	4822 122 31947	100 nF 63V
2780	4822 124 40435	10 µF 50V
2781	4822 124 40435	10 µF 50V
2782	4822 124 40435	10 µF 50V
2783	4822 124 40435	10 µF 50V
2784	4822 124 40435	10 µF 50V
2785	4822 124 40435	10 µF 50V
2786	4822 122 31797	22 nF 63V
2787	5322 124 41431	22 µF 35V
2787	4822 124 80232	22 µF 16V for SECAM L
2788	4822 122 31797	22 nF 63V
2789	4822 124 40435	10 µF 50V for SECAM L
2789	4822 124 40435	10 µF 50V for PAL I
2790	4822 122 31797	22 nF 63V for PAL I
2791	4822 122 32927	220 nF for PAL I
2818	5322 126 10511	1 nF 50V
2819	5322 126 10511	1 nF 50V
2822	4822 124 41576	2,2 µF 50V
2823	4822 124 41576	2,2 µF 50V
2824	4822 124 41576	2,2 µF 50V
2826	4822 124 40435	10 µF 50V
2827	4822 122 31797	22 nF 63V
2828	4822 124 80232	22 µF 16V
2829	4822 124 41577	4,7 µF 50V
2830	4822 124 40242	1 µF 63V
2833	4822 122 32482	22 pF 63V
2834	4822 122 32482	22 pF 63V

RESISTORS

3001	4822 051 20152	1,5 kΩ 0,1W
3002	4822 051 20152	1,5 kΩ 0,1W
3003	4822 051 20152	1,5 kΩ 0,1W
3004	4822 100 11875	4,7 kΩ
3005	4822 051 20562	5,6 kΩ
3006	4822 100 11842	4,7 kΩ
3007	4822 051 20103	10 kΩ 0,1W
3008	4822 101 11219	47 kΩ
3019	4822 051 20683	68 kΩ 0,1W

$ ... Safety component, use only this type

FM-Audio/Front end LAF

3020	4822 051 10333	33 kΩ 0,25W
3025	4822 051 20104	100 kΩ 0,1W
3026	4822 051 20222	2,2 kΩ 0,1W
3101	4822 051 20152	1,5 kΩ 0,1W
3102	4822 051 20152	1,5 kΩ 0,1W
3103	4822 051 20152	1,5 kΩ 0,1W
3104	4822 101 11217	2,2 kΩ
3105	4822 051 20472	4,7 kΩ 0,1W
3106	4822 100 11842	4,7 kΩ
3107	4822 051 20103	10 kΩ 0,1W
3108	4822 101 11219	47 kΩ
3119	4822 051 20683	68 kΩ 0,1W
3120	4822 051 10333	33 kΩ 0,25W
3125	4822 051 20104	100 kΩ 0,1W
3126	4822 051 20222	2,2 kΩ 0,1W
3202	4822 051 20221	220 Ω 0,1W
3208	4822 051 57502	7,5 kΩ 0,125W
3209	4822 051 20683	68 kΩ 0,1W
3210	4822 101 11219	47 kΩ
3212	4822 051 20121	120 Ω 0,1W
3213	4822 051 20121	120 Ω 0,1W
3214	4822 051 10102	1 kΩ 0,25W
3219	4822 051 20335	3,3 MΩ 0,1W
3226	4822 051 20103	10 kΩ 0,1W
3227	4822 051 20473	47 kΩ 0,1W
3702	4822 051 10101	100 Ω 0,25W
3703	4822 051 10101	100 Ω 0,25W
3705	4822 051 10223	22 kΩ 0,25W
3707	4822 051 20103	10 kΩ 0,1W for PAL I
3708	4822 051 20103	10 kΩ 0,1W
3720	4822 051 10822	8,2 kΩ 0,25W for SECAM L
3721	4822 051 20122	1,2 kΩ 0,1W for SECAM L
3723	4822 051 10332	3,3 kΩ 0,25W for SECAM L
3724	4822 051 20473	47 kΩ 0,1W
3725	4822 051 20682	6,8 kΩ 0,1W
3726	4822 051 10223	22 kΩ 0,25W
3727	4822 051 10184	180 kΩ 0,25W for SECAM L
3728	4822 051 20473	47 kΩ 0,1W for SECAM L
3729	4822 101 11218	22 kΩ
3730	4822 051 10223	22 kΩ 0,25W
3731	4822 051 10223	22 kΩ 0,25W
3732	4822 051 20822	8,2 kΩ 0,1W for SECAM L
3733	4822 051 20103	10 kΩ 0,1W for SECAM L
3734	4822 051 20332	3,3 kΩ 0,1W for SECAM L
3735	4822 051 10102	1 kΩ 0,25W
3736	4822 051 20222	2,2 kΩ 0,1W
3737	4822 051 20222	2,2 kΩ 0,1W
3738	4822 051 10471	470 Ω 0,25W
3739	4822 051 10271	270 Ω 0,25W
3740	4822 116 52175	100 Ω 0,5W
3760	4822 051 10223	22 kΩ 0,25W
3761	4822 051 20472	4,7 kΩ 0,1W
3762	4822 051 10759	75 Ω 0,25W
3763	4822 051 10102	1 kΩ 0,25W
3764	4822 051 10102	1 kΩ 0,25W
3765	4822 051 10102	1 kΩ 0,25W
3766	4822 051 10102	1 kΩ 0,25W
3767	4822 051 20472	4,7 kΩ 0,1W
3768	4822 051 10223	22 kΩ 0,25W
3769	4822 051 10102	1 kΩ 0,25W
3770	4822 051 10561	560 Ω 0,25W
3771	4822 051 10223	22 kΩ 0,25W for PAL I
3772	4822 051 10103	10 kΩ 0,25W for SECAM L
3773	4822 051 10101	100 Ω 0,25W
3774	4822 051 10101	100 Ω 0,25W
3780	4822 051 20101	100 Ω 0,1W
3781	4822 051 20101	100 Ω 0,1W
3782	4822 051 20472	4,7 kΩ 0,1W
3783	4822 051 20472	4,7 kΩ 0,1W
3784	4822 051 20222	2,2 kΩ 0,1W
3786	4822 100 11843	10 kΩ
3787	4822 051 20472	4,7 kΩ 0,1W
3788	4822 051 20104	100 kΩ 0,1W
3789	4822 051 20104	100 kΩ 0,1W
3790	4822 051 20104	100 kΩ 0,1W
3791	4822 051 10271	270 Ω 0,25W
3792	4822 051 10271	270 Ω 0,25W
3794	4822 051 20222	2,2 kΩ 0,1W for PAL I
3795	4822 051 10102	1 kΩ 0,25W for PAL I
3796	4822 051 20332	3,3 kΩ 0,1W for PAL I
3797	4822 051 20332	3,3 kΩ 0,1W for PAL I
3798	4822 051 20473	47 kΩ 0,1W for PAL I
3799	4822 051 10102	1 kΩ 0,1W for PAL I
3800	4822 051 20153	15 kΩ 0,1W for PAL I
3801	4822 051 20153	15 kΩ 0,1W for PAL I
3804	4822 051 20473	47 kΩ 0,1W for PAL I
3805	4822 051 20153	15 kΩ 0,1W for PAL I
3820	4822 051 10561	560 Ω 0,25W
3821	4822 051 10561	560 Ω 0,25W
3823	4822 051 20471	470 Ω 0,1W
3824	4822 051 20561	560 Ω 0,1W for PAL I
3824	4822 051 20471	470 Ω 0,1W
3825	4822 051 10123	12 kΩ 0,25W
3826	4822 051 10153	15 kΩ 0,25W
3828	4822 051 20271	270 Ω 0,1W
3829	4822 051 20472	4,7 kΩ 0,1W for SECAM L
3830	4822 051 10102	1 kΩ 0,25W for SECAM L
3831	4822 051 10104	100 kΩ 0,25W for SECAM L
3832	4822 051 20104	100 kΩ 0,1W for SECAM L
3833	4822 051 20472	4,7 kΩ 0,1W for SECAM L
3834	4822 051 20472	4,7 kΩ 0,1W for SECAM L
3901	4822 051 10008	0 Ω 0,25W
3902	4822 051 10008	0 Ω 0,25W for PAL I
3904	4822 051 10008	0 Ω 0,25W for SECAM L
3905	4822 051 10008	0 Ω 0,25W for SECAM L
3906	4822 051 10008	0 Ω 0,25W
3907	4822 051 10008	0 Ω 0,25W
3908	4822 051 10008	0 Ω 0,25W
3909	4822 051 10008	0 Ω 0,25W
3910	4822 051 10008	0 Ω 0,25W
3911	4822 051 10008	0 Ω 0,25W
3912	4822 051 10008	0 Ω 0,25W
3913	4822 051 10008	0 Ω 0,25W
3914	4822 051 10008	0 Ω 0,25W
3915	4822 051 10008	0 Ω 0,25W
3916	4822 051 10008	0 Ω 0,25W
3918	4822 051 10008	0 Ω 0,25W
3919	4822 051 10008	0 Ω 0,25W
3920	4822 051 10008	0 Ω 0,25W
3921	4822 051 10008	0 Ω 0,25W
3922	4822 051 10008	0 Ω 0,25W
3923	4822 051 10008	0 Ω 0,25W
3924	4822 051 10008	0 Ω 0,25W
3925	4822 051 10008	0 Ω 0,25W
3927	4822 051 10008	0 Ω 0,25W
3928	4822 051 10008	0 Ω 0,25W
3929	4822 051 10008	0 Ω 0,25W
3930	4822 051 10008	0 Ω 0,25W
3931	4822 051 10008	0 Ω 0,25W
3932	4822 051 10008	0 Ω 0,25W
3933	4822 051 10008	0 Ω 0,25W
3934	4822 051 10008	0 Ω 0,25W
3935	4822 051 10008	0 Ω 0,25W
3936	4822 051 10008	0 Ω 0,25W
3937	4822 051 10008	0 Ω 0,25W
3938	4822 051 10008	0 Ω 0,25W
3939	4822 051 10008	0 Ω 0,25W
3940	4822 051 10008	0 Ω 0,25W
3941	4822 051 10008	0 Ω 0,25W
3942	4822 051 10008	0 Ω 0,25W

$ ... Safety component, use only this type

FM-Audio/Front end LAF

3943	4822 051 10008	0	Ω	0,25W
3944	4822 051 10008	0	Ω	0,25W
3945	4822 051 10008	0	Ω	0,25W
3946	4822 051 10008	0	Ω	0,25W
3948	4822 051 10008	0	Ω	0,25W
3949	4822 051 10008	0	Ω	0,25W
3950	4822 051 10008	0	Ω	0,25W
3952	4822 051 10008	0	Ω	0,25W
3953	4822 051 10008	0	Ω	0,25W
3954	4822 051 10008	0	Ω	0,25W
3970	4822 051 10008	0	Ω	0,25W
3971	4822 051 10008	0	Ω	0,25W
3972	4822 051 10008	0	Ω	0,25W
3973	4822 051 10008	0	Ω	0,25W
3974	4822 051 10008	0	Ω	0,25W
3975	4822 051 10008	0	Ω	0,25W
3976	4822 051 10008	0	Ω	0,25W
3977	4822 051 10008	0	Ω	0,25W
3978	4822 051 10008	0	Ω	0,25W
3979	4822 051 10008	0	Ω	0,25W

COILS

5201	4822 157 53265	100 µH
5203	4822 157 53265	100 µH
5700	4822 157 63494	
5720	4822 157 70012	1,2 µH
5721	4822 157 63494	for SECAM L
5722	4822 157 63494	for SECAM L
5723	4822 157 63494	for SECAM L
5724	4822 157 63494	for SECAM L
5725	4822 157 60503	Filter 38,9 MHz
5726	4822 156 21669	for SECAM L
5727	4822 157 52842	15 µH
5728	4822 157 63494	for SECAM L
5729	4822 157 63494	for SECAM L
5760	4822 157 53251	8,2 µH
5761	4822 157 52285	6,8 µH
5770	4822 157 63494	
5820	4822 242 81201	Filter 39,2 MHz
5821	4822 157 70013	Filter 1,5 MHZ
5822	4822 157 70013	Filter 1,5 MHZ

DIODES

6201	4822 130 81268	SD101A
6720	5322 130 32076	BAT18 for SECAM L
6721	5322 130 32076	BAT18 for SECAM L
6722	5322 130 32076	BAT18 for SECAM L
6723	5322 130 31928	BAS16
6724	5322 130 32076	BAT18 for SECAM L
6725	5322 130 31928	BAS16
6730	5322 130 34337	BAV99 for PAL I
6731	5322 130 34337	BAV99 for PAL I
6823	5322 130 32076	BAT18 for SECAM L
6824	5322 130 32076	BAT18 for SECAM L

TRANSISTORS & IC's

7202	4822 209 31523	TDA2515A
7205	4822 209 31535	TDA2518/N1
7720	4822 209 31524	TDA3842T/V2
7721	5322 130 41982	BC848B for SECAM L
7722	5322 130 41982	BC848B
7760	5322 209 11578	PCF8574T
7761	5322 130 41983	BC858B
7762	5322 130 41982	BC848B
7763	5322 130 41983	BC858B
7764	5322 130 41983	BC858B
7765	5322 130 41982	BC848B
7766	4822 130 60146	DTC144EK for SECAM L
7780	4822 209 30147	TDA8415/V2
7780	4822 209 63967	TDA8417/V2
7781	5322 130 41982	BC848B for PAL I
7782	4822 130 60146	DTC144EK for PAL I
7791	4822 130 60146	DTC144EK for PAL I
7792	4822 130 60146	DTC144EK for PAL I
7795	5322 130 41983	BC858B for PAL I
7796	5322 130 41983	BC858B for PAL I
7820	4822 209 31529	TDA3868T/V1 for SECAM L
7820	4822 209 31525	TDA3867T/V1
7822	4822 130 62755	BF570
7823	5322 130 41982	BC848B for SECAM L
7824	5322 130 41982	BC848B for SECAM L

NICAM PCB LNIC

$	4822 214 33697	PAL I
$	4822 214 33698	PAL B/G

$ ... Safety component, use only this type

Operating panel LDC

CONNECTORS

	4822 276 11349	Switch
	4822 267 40773	Connector
	4822 267 50722	10 pin

MISCELLANEOUS

1001	4822 242 72574	Crystal 4,19 MHz
1005	4822 273 40411	Rotary switch

CAPACITORS

2010	4822 121 51387	10 nF 16V
2011	4822 124 42152	220 µF 16V
2020	4822 124 42152	220 µF 16V
2030	4822 121 51387	10 nF 16V
2051	4822 121 51319	1 µF 63V
2071	4822 121 51387	10 nF 16V
2072	4822 121 51387	10 nF 16V
2100	4822 122 33848	47 pF 50V
2101	4822 122 33848	47 pF 50V

RESISTORS

3001	4822 116 52175	100 Ω 0,5W
3002	4822 116 52175	100 Ω 0,5W
3011	4822 116 52283	4,7 kΩ 0,5W
3012	4822 116 52283	4,7 kΩ 0,5W
3013	4822 116 52211	150 Ω 0,5W
3014	4822 116 52211	150 Ω 0,5W
3015	4822 116 52211	150 Ω 0,5W
3017	4822 116 52211	150 Ω 0,5W
3020	4822 116 52182	15 Ω 0,5W
3021	4822 116 52182	15 Ω 0,5W
3022	4822 116 52233	10 kΩ 0,5W
3036	4822 116 52233	10 kΩ 0,5W
3040	4822 116 52249	1,8 kΩ 0,5W
3041	4822 116 52249	1,8 kΩ 0,5W
3042	4822 116 52249	1,8 kΩ 0,5W
3050	4822 116 52283	4,7 kΩ 0,5W
3051	4822 116 52175	100 Ω 0,5W
3052	4822 116 52175	100 Ω 0,5W
3053	4822 050 24708	4,7 Ω 0,6W
3071	4822 116 52233	10 kΩ 0,5W
3072	4822 116 52233	10 kΩ 0,5W

COILS

5000	4822 157 52286	22 µH

DIODES

6001	4822 130 30621	1N4148
6002	4822 130 30621	1N4148
6003	4822 130 30621	1N4148
6005	4822 130 30621	1N4148
6006	4822 130 30621	1N4148
6007	4822 130 30621	1N4148
6050	4822 130 34278	BZX79-B6V8
6101	4822 130 83091	TLHG4205
6102	4822 130 83092	TLHR4205
6103	4822 130 83089	TLHY4205
6104	4822 130 83089	TLHY4205

TRANSISTORS & IC's

7101	4822 209 31531	LUDP5-2U
7102	4822 130 91141	FIP14CM5R Display
7103	4822 214 33534	IR-Receiver

$ ... Safety component, use only this type

Control board LCO

CONNECTORS

	4822 267 50723	13 pin
	4822 267 50722	10 pin

MISCELLANEOUS

1401	4822 242 72892	Crystal 32,768 kHz
1752	4822 242 81099	Crystal KD7218FFA
1989	4822 138 10419	Accu 60mA/1,2V
1990	4822 138 10419	Accu 60mA/1,2V

CAPACITORS

2401	4822 125 50394	4,5 pF
2402	4822 122 31797	22 nF 63V
2404	4822 122 32442	10 nF 50V
2405	4822 122 31947	100 nF 63V
2406	4822 122 31947	100 nF 63V
2408	4822 122 31947	100 nF 63V
2751	4822 122 31797	22 nF 63V
2752	4822 122 32482	22 pF 63V
2753	4822 122 32482	22 pF 63V
2755	4822 124 41506	47 µF 16V

RESISTORS

3303	4822 051 10182	1,8 kΩ 0,25W
3304	4822 051 10822	8,2 kΩ 0,25W
3307	4822 051 10103	10 kΩ 0,25W
3311	4822 051 10101	100 Ω 0,25W
3312	4822 051 10101	100 Ω 0,25W
3313	4822 051 10102	1 kΩ 0,25W
3314	4822 051 10102	1 kΩ 0,25W
3315	4822 051 10008	0 Ω 0,25W
3316	4822 051 10008	0 Ω 0,25W
3430	4822 051 10223	22 kΩ 0,25W
3431	4822 051 10472	4,7 kΩ 0,25W
3432	4822 051 10333	33 kΩ 0,25W
3433	4822 051 10103	10 kΩ 0,25W
3434	4822 051 10101	100 Ω 0,25W
3435	4822 051 10101	100 Ω 0,25W
3436	4822 051 10182	1,8 kΩ 0,25W
3764	4822 051 10472	4,7 kΩ 0,25W
3765	4822 051 10472	4,7 kΩ 0,25W
3901	4822 051 10008	0 Ω 0,25W
3910	4822 051 10008	0 Ω 0,25W
3911	4822 051 10008	0 Ω 0,25W
3912	4822 051 10008	0 Ω 0,25W
3998	4822 051 10008	0 Ω 0,25W
3999	4822 051 10008	0 Ω 0,25W

COILS

5750	4822 157 53252	22 µH

TRANSISTORS & IC's

7201	5322 130 41982	BC848B
7301	4822 130 80622	BAT54
7303	5322 130 41982	BC848B
7410	5322 130 41983	BC858B
7453	4822 209 73197	PCF8583P
7750	5322 209 11318	P8032AH ITL
7751	4822 209 31837	EPROM LUCT4
7752	4822 209 61647	CD74HCT573E
7753	4822 209 31318	HY6264ALP-10

$ ... Safety component, use only this type

Control board OSD LCOOSD

CONNECTORS

	4822 267 50723	13 pin
	4822 267 50722	10 pin
	4822 267 40624	5 pin

MISCELLANEOUS

1401	4822 242 72892	Crystal 32,768 kHz
1600	4822 242 72965	Crystal 17,734476 MHz
1752	4822 242 81099	Crystal KD7218FFA
1989	4822 138 10419	Accu 60mA/1,2V
1990	4822 138 10419	Accu 60mA/1,2V

CAPACITORS

2401	4822 125 50394	4,5 pF
2402	5322 122 32654	22 nF 63V
2404	4822 122 32442	10 nF 50V
2405	4822 122 31947	100 nF 63V
2406	4822 122 31947	100 nF 63V
2408	4822 122 31947	100 nF 63V
2601	4822 124 23053	1 µF 50V
2602	5322 122 32654	22 nF 63V
2603	5322 122 32654	22 nF 63V
2604	4822 122 31947	100 nF 63V
2605	4822 124 80231	47 µF 16V
2606	4822 122 31947	100 nF 63V
2607	5322 122 32452	47 pF 63V
2609	5322 122 32659	33 pF 50V
2612	4822 122 31947	100 nF 63V
2613	4822 124 80231	47 µF 16V
2617	5322 122 32448	10 pF 50V
2618	4822 125 50412	7,5 pF
2751	4822 122 31797	22 nF 63V
2752	5322 122 32658	22 pF 50V
2753	5322 122 32658	22 pF 50V
2755	4822 124 80231	47 µF 16V

RESISTORS

3303	4822 051 20182	1,8 kΩ 0,1W
3304	4822 051 20822	8,2 kΩ 0,1W
3307	4822 051 20103	10 kΩ 0,1W
3311	4822 051 20101	100 Ω 0,1W
3312	4822 051 20101	100 Ω 0,1W
3313	4822 051 10102	1 kΩ 0,25W
3314	4822 051 10102	1 kΩ 0,25W
3430	4822 051 10223	22 kΩ 0,25W
3431	4822 051 20472	4,7 kΩ 0,1W
3432	4822 051 10333	33 kΩ 0,25W
3433	4822 051 10103	10 kΩ 0,25W
3434	4822 051 20101	100 Ω 0,1W
3435	4822 051 20101	100 Ω 0,1W
3436	4822 051 20182	1,8 kΩ 0,1W
3604	4822 051 20472	4,7 kΩ 0,1W
3605	4822 051 20473	47 kΩ 0,1W
3606	4822 051 10182	1,8 kΩ 0,25W
3607	4822 100 11841	1 kΩ
3608	4822 051 20331	330 Ω 0,1W
3609	4822 051 20109	10 Ω 0,1W
3610	4822 051 20821	820 Ω 0,1W
3611	4822 116 52215	220 Ω 0,5W
3613	4822 051 10102	1 kΩ 0,25W
3615	4822 051 10223	22 kΩ 0,25W
3619	4822 051 20472	4,7 kΩ 0,1W
3620	4822 051 20271	270 Ω 0,1W
3621	4822 051 10271	270 Ω 0,25W
3622	4822 051 20222	2,2 kΩ 0,1W
3630	4822 051 10472	4,7 kΩ 0,25W
3632	4822 051 10472	4,7 kΩ 0,25W
3633	4822 051 20472	4,7 kΩ 0,1W
3641	4822 051 20271	270 Ω 0,1W
3642	4822 051 20689	68 Ω 0,1W
3643	4822 051 20821	820 Ω 0,1W
3764	4822 051 20472	4,7 kΩ 0,1W
3765	4822 051 20472	4,7 kΩ 0,1W
3900	4822 051 10008	0 Ω 0,25W
3901	4822 051 20008	0 Ω 0,1W
3902	4822 051 20008	0 Ω 0,1W
3904	4822 051 10008	0 Ω 0,25W
3907	4822 051 10008	0 Ω 0,25W
3910	4822 051 10008	0 Ω 0,25W
3913	4822 051 10008	0 Ω 0,25W
3914	4822 051 10008	0 Ω 0,25W
3915	4822 051 10008	0 Ω 0,25W
3916	4822 051 20008	0 Ω 0,1W
3917	4822 051 10008	0 Ω 0,25W
3918	4822 051 10008	0 Ω 0,25W
3919	4822 051 20008	0 Ω 0,1W
3920	4822 051 20008	0 Ω 0,1W

COILS

5602	4822 157 60501	
5603	4822 157 52286	22 µH
5750	4822 157 50961	22 µH

DIODES

6301	4822 130 31983	BAT85
6612	5322 130 30691	BAW56

TRANSISTORS & IC's

7201	5322 130 41982	BC848B
7303	5322 130 41982	BC848B
7410	5322 130 41983	BC858B
7453	4822 209 73197	PCF8583P
7600	5322 130 41983	BC858B
7601	4822 130 60145	DTC124E/25
7603	5322 130 41982	BC848B
7604	5322 130 41982	BC848B
7606	5322 130 41982	BC848B
7650	4822 209 61821	UPD6450CX-002
7750	5322 209 11318	P8032AH ITL
7751	4822 209 31838	Eprom LUCO4
7752	4822 209 61647	CD74HCT573E
7753	4822 209 31553	HY6264ALJ-10

Control board Teletext LCOVPT

CONNECTORS

	4822 267 50723	13 pin
	4822 267 50722	10 pin
	4822 267 40624	5 pin

MISCELLANEOUS

1401	4822 242 72892	Crystal 32,768 kHz
1752	4822 242 81099	Crystal KD7218FFA
1800	4822 242 72367	Crystal 13,875 MHz
1900	4822 320 40186	Delay line
1989	4822 138 10419	Accu 60mA/1,2V
1990	4822 138 10419	Accu 60mA/1,2V

CAPACITORS

2301	4822 122 31797	22 nF 63V
2401	4822 125 50394	4,5 pF
2402	4822 122 31797	22 nF 63V
2403	4822 126 10004	120 pF 63V
2404	4822 122 33177	10 nF 50V
2405	4822 122 31947	100 nF 63V
2406	4822 122 31947	100 nF 63V
2408	4822 122 31947	100 nF 63V
2409	4822 122 31947	100 nF 63V
2411	4822 124 80228	4,7 µF 25V
2413	5322 122 33446	3,3 nF 63V
2414	4822 122 32542	47 nF 63V
2415	4822 124 80228	4,7 µF 25V
2416	4822 124 42213	100 µF 16V
2417	4822 124 80228	4,7 µF 25V
2418	4822 122 31947	100 nF 63V
2419	4822 124 23053	1 µF 50V
2751	4822 122 31797	22 nF 63V
2752	5322 122 32658	22 pF 50V
2753	5322 122 32658	22 pF 50V
2754	4822 124 80043	10 µF 50V
2755	4822 124 80231	47 µF 16V
2757	4822 124 41876	220 µF 63V
2759	4822 121 51387	10 nF 16V
2762	5322 122 32481	15 pF 50V
2763	5322 122 34123	1 nF 50V
2764	5322 122 32268	470 pF 50V
2765	5322 122 32654	22 nF 63V
2766	4822 122 33216	270 pF 50V
2767	5322 122 32531	100 pF 50V
2768	4822 122 32575	220 pF 500V
2771	5322 116 80853	560 pF 63V
2773	4822 124 80231	47 µF 16V
2774	4822 124 80227	2,2 µF 35V
2775	4822 124 80227	2,2 µF 35V
2776	4822 124 80227	2,2 µF 35V
2780	4822 124 80231	47 µF 16V
2781	4822 122 32542	47 nF 63V
2789	4822 124 80227	2,2 µF 35V
2792	4822 122 32542	47 nF 63V
2799	4822 122 32891	68 nF 63V
2800	5322 122 32481	15 pF 50V
2802	4822 122 31825	27 pF 63V
2803	4822 122 31947	100 nF 63V
2847	4822 124 80043	10 µF 50V
2852	4822 122 33177	10 nF 50V
2853	4822 122 31947	100 nF 63V
2857	5322 122 34123	1 nF 50V
2858	4822 122 31947	100 nF 63V
2859	4822 126 10004	120 pF 63V
2860	4822 122 33177	10 nF 50V
2861	5322 122 34123	1 nF 50V
2862	4822 122 32442	10 nF 50V
2863	4822 122 31947	100 nF 63V
2864	4822 122 31947	100 nF 63V
2865	4822 122 33177	10 nF 50V
2870	4822 122 32542	47 nF 63V
2871	4822 122 32542	47 nF 63V
2872	4822 122 32542	47 nF 63V
2873	4822 122 32542	47 nF 63V
2874	4822 124 80043	10 µF 50V
2875	4822 122 32442	10 nF 50V
2876	4822 122 32891	68 nF 63V
2877	4822 124 80228	4,7 µF 25V
2882	5322 122 34123	1 nF 50V
2890	5322 122 32481	15 pF 50V
2891	5322 122 32481	15 pF 50V

RESISTORS

3022	4822 051 20472	4,7 kΩ 0,1W
3053	4822 051 20221	220 Ω 0,1W
3301	4822 116 52226	560 Ω 0,5W
3303	4822 051 20182	1,8 kΩ 0,1W
3304	4822 051 20822	8,2 kΩ 0,1W
3307	4822 051 20103	10 kΩ 0,1W
3311	4822 051 20101	100 Ω 0,1W
3312	4822 051 20101	100 Ω 0,1W
3313	4822 051 10102	1 kΩ 0,25W
3314	4822 051 10102	1 kΩ 0,25W
3315	4822 051 20008	0 Ω 0,1W
3316	4822 051 20008	0 Ω 0,1W
3402	4822 051 20222	2,2 kΩ 0,1W
3404	4822 051 10103	10 kΩ 0,25W
3405	4822 116 52233	10 kΩ 0,5W
3406	4822 101 11218	22 kΩ
3430	4822 116 52257	22 kΩ 0,5W
3431	4822 051 20472	4,7 kΩ 0,1W
3432	4822 051 10333	33 kΩ 0,25W
3433	4822 051 10103	10 kΩ 0,25W
3434	4822 051 10101	100 Ω 0,25W
3435	4822 051 10101	100 Ω 0,25W
3436	4822 051 20182	1,8 kΩ 0,1W
3508	4822 051 20561	560 Ω 0,1W
3509	4822 116 52226	560 Ω 0,5W
3510	4822 051 20221	220 Ω 0,1W
3511	4822 051 10822	8,2 kΩ 0,25W
3512	4822 051 20222	2,2 kΩ 0,1W
3513	4822 051 20224	220 kΩ 0,1W
3514	4822 051 20472	4,7 kΩ 0,1W
3762	4822 116 52215	220 Ω 0,5W
3763	4822 116 52215	220 Ω 0,5W
3764	4822 051 20472	4,7 kΩ 0,1W
3765	4822 051 20472	4,7 kΩ 0,1W
3771	4822 051 10102	1 kΩ 0,25W
3773	4822 051 20821	820 Ω 0,1W
3774	4822 051 10472	4,7 kΩ 0,25W
3775	4822 051 20472	4,7 kΩ 0,1W
3776	4822 051 20472	4,7 kΩ 0,1W
3780	4822 051 20689	68 Ω 0,1W
3782	4822 116 52226	560 Ω 0,5W
3783	4822 116 52226	560 Ω 0,5W
3784	4822 116 52226	560 Ω 0,5W
3786	4822 051 10102	1 kΩ 0,25W
3787	4822 051 10102	1 kΩ 0,25W
3788	4822 051 10689	68 Ω 0,25W
3790	4822 051 10561	560 Ω 0,25W
3791	4822 051 10561	560 Ω 0,25W
3792	4822 051 10561	560 Ω 0,25W
3793	4822 051 10331	330 Ω 0,25W
3794	4822 051 10331	330 Ω 0,25W
3795	4822 051 10331	330 Ω 0,25W
3800	4822 051 20563	56 kΩ 0,1W

$ ... Safety component, use only this type

Control board Teletext LCOVPT

3804	4822 051 10472	4,7 kΩ 0,25W
3812	4822 051 20182	1,8 kΩ 0,1W
3834	4822 051 20471	470 Ω 0,1W
3835	4822 051 20471	470 Ω 0,1W
3853	4822 051 10102	1 kΩ 0,25W
3854	4822 051 10102	1 kΩ 0,25W
3856	4822 051 20563	56 kΩ 0,1W
3857	4822 051 20681	680 Ω 0,1W
3858	4822 051 20103	10 kΩ 0,1W
3864	4822 051 10102	1 kΩ 0,25W
3867	4822 051 10102	1 kΩ 0,25W
3868	4822 051 10181	180 Ω 0,25W
3869	4822 051 10102	1 kΩ 0,25W
3876	4822 051 20479	47 Ω 0,1W
3877	4822 051 20271	270 Ω 0,1W
3879	4822 051 20225	2,2 MΩ 0,1W
3880	4822 051 20101	100 Ω 0,1W
3900	4822 051 10008	0 Ω 0,25W
3901	4822 051 10008	0 Ω 0,25W
3902	4822 051 20008	0 Ω 0,1W
3903	4822 051 10008	0 Ω 0,25W
3904	4822 051 10008	0 Ω 0,25W
3905	4822 051 10008	0 Ω 0,25W
3906	4822 051 20008	0 Ω 0,1W
3907	4822 051 10008	0 Ω 0,25W
3908	4822 051 10008	0 Ω 0,25W
3909	4822 051 20008	0 Ω 0,1W
3910	4822 051 10008	0 Ω 0,25W
3911	4822 051 10008	0 Ω 0,25W
3912	4822 051 20008	0 Ω 0,1W
3913	4822 051 10008	0 Ω 0,25W
3914	4822 051 20008	0 Ω 0,1W
3915	4822 051 10008	0 Ω 0,25W
3950	4822 051 10008	0 Ω 0,25W
3952	4822 051 10008	0 Ω 0,25W
3953	4822 051 10008	0 Ω 0,25W
3954	4822 051 10008	0 Ω 0,25W
3955	4822 051 10008	0 Ω 0,25W
3957	4822 051 10008	0 Ω 0,25W
3958	4822 051 20008	0 Ω 0,1W
3959	4822 051 10008	0 Ω 0,25W
3961	4822 051 10008	0 Ω 0,25W
3997	4822 051 20008	0 Ω 0,1W

COILS

5400	4822 157 52265	100 µH
5571	4822 157 52825	COIL 60 UH
5600	4822 157 51999	10UH10%
5700	4822 157 52265	100 µH
5750	4822 157 50961	22 µH
5780	4822 157 50961	22 µH
5800	4822 157 52224	15UH
5801	4822 157 51999	10UH10%
5802	4822 157 70131	

DIODES

6201	4822 130 30621	1N4148
6301	4822 130 31983	BAT85
6302	4822 130 80622	BAT54
6780	4822 130 30621	1N4148

TRANSISTORS & IC's

7008	4822 130 61495	DTA124EK	
7011	4822 130 60145	DTC124E/25	
7096	5322 209 11306	HEF4094BT	PHIN
7303	5322 130 41982	BC848B	
7401	5322 130 41983	BC858B	
7410	5322 130 41983	BC858B	
7453	4822 209 73197	PCF8583P	
7504	4822 209 73852	PMBT2369	
7750	5322 209 11318	P8032AH	ITL
7751	4822 209 31835	LUCV4	
7752	4822 209 61647	CD74HCT573E	
7753	4822 209 31553	HY6264ALJ-10	
7760	4822 209 31716	SDA5243	
7770	4822 209 31553	HY6264ALJ-10	
7780	4822 209 31717	SAA5231	
7785	4822 209 61806	AN3916	
7790	4822 209 71415	MC1377P	
7795	4822 209 31718	BA7607	
7801	5322 130 41983	BC858B	
7813	5322 130 41982	BC848B	
7814	5322 130 41982	BC848B	
7815	4822 130 60145	DTC124E/25	
7816	5322 130 41982	BC848B	
7821	4822 130 60145	DTC124E/25	

Cables

4822 321 60916	Cable Tuner/Modulator
4822 320 50302	Flatcable L4 - CS2
4822 320 50292	Flatcable B13 - L2
4822 320 50287	Flatcable B8 - L3
4822 320 50291	Flatcable B10 - L1
4822 320 50288	Flatcable B1 - L6
4822 320 50289	Flatcable B2 - L2

$ ... Safety component, use only this type